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# VETERINARY MEDICINE

*May, 1931*

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No. 5
VOL. XXVI

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

The ostrich is the only bird in which natural attacks of anthrax occur. Anthrax in the ostrich is usually of the fulminating type.

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From the investigation it appears that there is a strain of *Br. abortus* in Palestine which is of low virulence for cattle. Unfortunately, infection with it confers little or no immunity to native cattle.

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Studies of Schwartz and Price of the Zoological Division of the B. A. I. have definitely established the fact that most, if not all of the cases of so-called parasitic livers contained lesions that have been produced by *Stephanurus dentatus,* the swine kidney worm.

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In an investigation conducted by the U. S. Public Health Service. it is found that in dogs receiving five to ten grams of onions (raw or cooked) per kilo of body weight, there was a slight and gradual reduction in the number of red blood cells and in the amount of hemoglobin. In dogs receiving more than 15 grams of onions per kilo daily there was a sudden and marked decrease in the amount of red blood cells and in the amount of hemoglobin. That is, a severe anemia was produced. The animals did not die nor lose weight and after a long period there was a slow return to normal notwithstanding that they continued to receive onions in the feed.

The loss due to anaplasmosis in the State of Kansas is estimated to amount to a half million dollars annually.

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In Kenya (Africa) the *Bunostomum trigonocephalum* (a namatode) is the most serious parasitic pest of sheep.

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Anaplasmosis of cattle may be distinguished from tick fever by the lack of bloody urine which usually accompanies tick fever. A microscopic study of the blood of animals affected with anaplasmosis shows indications of severe anemia with the causative parasites appearing as small globular bodies in the red blood cells, usually situated near their borders.

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The occurrence of anaplasmosis in a herd may result in losses ranging as high as 40% of the animals affected and those that recover may be stunted and be in poor condition for a long time. The microparasite which causes the disease can be transmitted from sick to healthy cattle by means of certain ticks and by veterinary instruments.

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It was found by Kligler and Ashner that the same infective mosquito may produce a number of consecutive infections of fowl pox over a period of 16 days. The fact that the insect fed on other animals during this period did not impair its infectivity when it was permitted to feed on fowls. The virus appears to be localized on the proboscis.

A type of leishmaniasis common in dogs in Bagdad is readily transmitted to man. It causes cutaneous lesions in both dogs and man.

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Of 225 patients suffering from various acute intestinal diseases in the Botkin Barracks Hospital in Leningrad, 49% were found to be infected with various protozoa.

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Paralytic accidents following the treatment of humans with carbolized rabies virus is relatively rare. Stuart and Krikovian report that of 171,395 patients treated five cases of paralysis occurred.—Bio. Abst. 8693.

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Our first boards of health were born of fear and hope. Fear of pestilence and hope that quarantine would prevent the spread of epidemic diseases. It was natural that they be given unusual police power and definite control of the individual for the good of the community.

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Undulant fever is stated to be an occupational disease of veterinarians in southeastern France. The Inspector General of Veterinary Services reports 13 cases. Twelve had a history of having handled aborting sheep or goats. The period of incubation ranged from a fortnight to three weeks. All cases recovered.

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Eighty airplanes, carrying mail, express and passengers arrive or depart from Chicago's municipal airport daily; an average of almost one plane every 15 minutes day and night. This is a greater number of planes than Berlin, London or Paris has on regular schedule or than any other airport in the world has, yet the municipal airport at Chicago is only one of more than a dozen public airports in the city and environs. Chicago appears to be secure in its title of "Air Transportation Center of the World" as it has for generations been the principal railroad center of the world.

Since 1909 about 6,000 insane and feeble minded men and women have been sterilized in the California state hospitals in accordance with the state eugenic sterilization law. The results have been satisfactory in practically all instances to the patients and their families. Sterilization was accomplished by vasectomy and salpingectomy.—Bio. Abst. 24330.

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Nine of eleven cases of undulant fever, occurring in Waycross, Georgia were investigated. Six had used raw milk exclusively and three had used it freely. Eight of the nine cases used raw milk from one dairy, that contained cows that reacted positively to the abortus agglutination test. The evidence indicates that these cases of undulant fever were due to the porcine strain of the abortus organisms.

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## ADVANTAGES OF MILK IN THE DIET

An extensive study of the effect of the addition of milk to the diet of children of school age was recently made in Scotland. Twenty thousand children between the ages of five and twelve years, in 67 schools were used for the experiment.

Five doctors and 17 nurses gave the children a careful physical examination and recorded measurements before the experiment began and again at its conclusion.

Ten thousand of the children were given three-fourths of a pint of milk during the forenoon each day, 5,000 receiving raw milk and 5,000 pasteurized milk, and the remaining 10,000 children were given no milk at school.

All the milk fed children grew more rapidly than the ones who were not fed milk. The older children showed as much increase in growth as the younger ones. Teachers reported that mental lassitude gave way to alertness and morose children on the milk diet became talkative. There was a definite improvement in the rate of learning of the milk fed children. There was no difference in growth between the group receiving raw and the group receiving pasteurized milk.

The zoological name of the common house cat is *Felis domestica;* of the dog, *Canis familiaris;* of swine, *Sus scrofa;* of sheep, *Ovis aries;* of the goat, *Capra hircus;* of cattle, *Bos taurus;* of the horse, *Equus caballus;* of the ass, *Equus asinus.* Among domesticated birds, the zoological terms are: for chickens, *Gallus domesticus;* for ducks, *Anas boschas* (Mallard) and *Cairina moschata* (Muscovy); for turkeys, *Meleagris gallopavo.* Man in zoological nomenclature becomes *Homo sapiens.*

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An infectious disease of swine characterized by a high temperature, a mucopurulent nasal discharge, diarrhea, partial paralysis of the hind quarters and coma is more or less prevalent in Northern Transvaal according to Steyn. The principal lesions are hydrothorax, hydro-pericardium, hydroperitoneum, subepi-cardial, subendo-cardial and intra-myocardial hemorrhages, bronchopneumonia, engorged spleen, renal hemorrhages, gastro-enteritis and tumefaction and hemorrhages of the lymph nodes. The disease affects swine of all ages and breeds and is not transmissible to horses, cattle, sheep, goats, dogs, cats, etc.

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Hides have long been subject to wide price variations and in part responsible for fluctuations in the price of live cattle. Hide prices are now at the lowest level in 35 years. Hide supplies being a by-product of the cattle industry are not readily responsive to changes in demand for leather and the variations in hide prices. In 1920 a steer hide was worth nearly $20.00; in 1921 its value dropped to $5.00. In 1922 its price was back to $10.00 and in 1929 it was worth nearly $10.00. Now it averages less than $5.00. More than 80% of the hides produced are used in the boot and shoe industry. Periods of unemployment always reduce the consumption of shoes and therefore the price of hides and they in turn affect the price of cattle. Only a normal stock of hides are on hand and any material improvement in demand for shoes should be reflected in hide prices and cattle prices.

Science without experience does not bring much confidence.—Ambroise Paré.

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Samples of blood that have been frozen will not give an accurate test for Bang's disease.—C. H. Kitselman.

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Science is a first rate piece of furniture for a man's upper chamber if he has common sense upon the ground floor.—Oliver Wendell Holmes.

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Best results in clinical experience must ever remain the final and crucial test of every form of therapy. — Lewellys F. Barker.

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In taking samples of blood for the agglutination test for Bang's disease, be sure that your tubes are clean and dry. A few drops of water will ruin the samples.—C. H. Kitselman.

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The private veterinarian is the scout who locates and reports contagious diseases to the official veterinarian and without the former and his ability to diagnose contagious diseases, there can be no veterinary sanitary service.—W. L. Williams.

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The original outbreaks in America of contagious pleuro-pneumonia in cattle, dourine in horses and many other contagious diseases were first diagnosed by private practitioners and reported to official veterinarians.—W. L. Williams.

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If you take away from me live culture vaccine for the prevention of Bang's disease, I'm ruined. I vaccinate at the time of breeding and again 60 to 90 days later. I have good results from this procedure.—H. C. Gale.

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A considerable portion of anthrax spores kept dry at room temperature and exposed to diffuse daylight are capable of germinating for a period of at least ten years, and some spores retain their vitality under these conditions for a period of 23 years.

# Cystitis and Pyelonephritis in Cattle

By C. C. PALMER, Newark, Delaware
Delaware Agricultural Experiment Station

THE specific infectious disease, pyelonephritis of cattle, caused by a diphtheroid Gram-positive organism has not been reported in the veterinary literature of this country until within recent years. As the causative organism is believed to be widely distributed and reports upon the disease have not been numerous in this country, a brief discussion of the disease, together with a few case reports, may be of interest to the readers of VETERINARY MEDICINE. In Europe, pyelonephritis is regarded as a very frequent disease of cattle.[1] In this country Boyd[2] reported his observations upon the disease in 1918 and in 1927. He has encountered the disease in several herds in various parts of Minnesota and is of the opinion that "pyelonephritis accompanied with inflammation of the ureters and bladder is a fairly common disease in cows." Jones and Little[3] reported in 1925 the results of a careful study of twenty cases. They are of the opinion that the specific cystitis and pyelonephritis described by them may be of considerable economic importance. Bemis,[4] in 1926, described one case in detail and states "pyelonephritis seems to be quite common in cows and that the condition seems to be identical with the condition discussed under this heading in Hutyra and Marek." In 1923, the writer,[5] described one case occurring in a pure-bred Guernsey cow. The animal became ill suddenly, showing symptoms of cystitis (hematuria). Death occurred within thirty-six hours. The autopsy revealed cystitis, pyelonephritis (an abscess in nearly every lobe of both kidneys) hepatitis, pleuritis and a sharp foreign body and an abscess in the region between the reticulum and diaphragm. At the time it was concluded the case was "induced primarily by a foreign body perforating the reticulum and introducing a pyogenic infection which spread by metastasis, and in which the principal lesions and symptoms were those of cystitis and nephritis." As three typical cases of cystitis and pyelonephritis uncomplicated with a foreign body involvement have been encountered in this herd since the 1923 case, it is now our opinion, that our 1923 case was a typical case and that the lesions produced by the foreign body were incidental. Prior to the 1923 experience, cases in which the principal symptoms were those of cystitis were observed, but the real significance of the disease was not appreciated. During recent years a number of cases of cystitis and pyelonephritis have been observed, but in no herds under our observation has the disease spread rapidly.

## Etiology

Considerable discussion has arisen as to whether we are dealing with a specific infectious disease or with non-specific infections of the bladder and kidneys. European investigators have quite consistently cultivated, from affected kidneys, a Gram-positive diphtheroid which Enderlen[6] named *B. pyelonephritis* boum. Owing to inability to reproduce the disease with this organism European investigators question the relationship of the diphtheroid to pyelonephritis. The organism studied by Jones and Little[7] appears to be identical with the one found in Europe. They were able to confirm the work of the European workers that the organism is not pathogenic for rabbits or guinea pigs, or for cows injected intravenously. They were able, however, to reproduce the disease by the introduction of small quantities of cultures into the bladder by way of the urethra.

[1] Hutyra and Marek, Pathology and Therapeutics of the Diseases of Domestic Animals. Sec. Am. Ed. 1916, Vol. I, P. 1090.
[2] Boyd, W. L., Cornell Veterinarian, Jan. 1928, P. 4556.
[3] Jones, F. S. and Little, R. B., Jour. Exp. Med., Vol. XLII, No. 5, P. 593-607, 1925.
[4] Bemis, H. E., Veterinary Medicine, 1926, Vol. XXI, P. 161.
[5] Palmer, C. C., Ohio State Vet. Alumni Quart., Vol. XI, No. 1, P. 22.
[6] Enderlen, D., Cited by Jones and Little.

It is not to be expected that every case of cystitis or pyelonephritis encountered in practice will prove to be the specific disease described by Jones and Little. Aside from the Gram-positive diphtheroid which is undoubtedly wide-spread in this country and which is responsible for many of these cases, other types of organisms are capable of causing inflammation of the bladder, ureter and kidneys. In bladder and kidney disease resulting shortly after parturition and in which abscesses formation develops, the specific cause is quite likely to be one of the common pus producers, such as *Eberthella pyogenes,* staphylococci, etc. In Europe, *Escherichia coli* and *Mycobacterium tuberculosis* in addition to the above named organisms have been isolated from cases of cystitis and pyelonephritis. Without a bacteriological study the clinician will have difficulty in determining positively whether he is dealing with the specific infectious diseases caused by *B. pyelonephritis* boum or a form of the disease caused by some of the common pus producing organisms.

*B. pyelonephritis* boum, the cause of specific infectious cystitis and pyelonephritis of cows is in several respects unique. It possesses no pathogenicity for the smaller animals. It inhabits only the urinary tract of cows which is unlike other organisms associated with renal infection, such as *Esch. coli* and *Eberth. pyogenes.* It is not an inhabitant of the normal vagina or uterus and apparently plays no part in metritis. It possesses but little pathogenicity for cows unless it finds its way into the urine where it grows readily and attacks the structure lining the bladder.

### Natural Infection

As it has been definitely demonstrated by experimental evidence that under favorable conditions diphtheroids introduced into the bladder may produce cystitis, pyelitis and pyelonephritis the question arises how does natural infection take place? Jones and Little[8] in a recent contribution to the epidemiology of specific infectious cystitis and pyelonephritis of cows found that the lower genito-urinary tract of calves may harbor the organism. Thus many cases may really originate as infections during early life. The organisms are able to maintain themselves on the mucous membranes of the lower urinary tract where little damage is done, but by a gradual, ascending growth they may finally reach the upper urethra and bladder. Jones and Little[7] also call attention to the fact that there is evidence for a transmission of the disease by contact infection, as when the same individual carries both normal and infected cows. Once the bacilli gain access to the bladder, they multiply and produce the characteristic cystitis. This disease is apparently independent of genital diseases. Natural infection does not take place by way of the blood stream, since cows injected intravenously with cultures failed to develop cystitis. Males are relatively insusceptible to the disease. Jones and Little are of the opinion the bull does not often act to disseminate the disease during copulation.

In the non-specific forms of cystitis and pyelonephritis caused by pus producing organisms, *E. coli,* etc., natural infection may be urogenous in origin as for example following an attack of metritis or the infection may gain entrance direct to the kidneys by way of the circulation. *Eberthella pyogenes* is encountered frequently in bovine metritis. From the uterus and vagina this organism may ascend the urinary tract causing a purulent cystitis and pyelonephritis.

### Symptoms

Without the aid of a bacteriological diagnosis the clinician will experience considerable difficulty in differentiating between the specific disease caused by the diphtheroid organism (*B. pyelonephritis* boum) and those forms caused by the pus producing types as the symptomatology of the different types of infection is similar. The writer has studied a number of both types of cases and it has been only by bacteriological means that it has been possible to make a differentiation in the majority of them.

In all types of infection the disease is

[7] Jones, F. S. and Little, R. B., Jour. Exp. Med., Vol. XLIV, No. 1, Pp. 11-20. July 1, 1926.
[8] Jones and Little, Jour. Exp. Med., Vol. 51, No. 6, pp. 909-230. June, 1930.

chronic and the pathological changes are well established before clinical symptoms become evident. Several of our cases have been discovered during the course of routine examinations for pregnancy. When the animal starts showing symptoms of the disease the symptoms may be either acute or chronic. In the acute cases there is usually a sudden loss of appetite, frequent passage of turbid or blood-stained urine and straining after urination. The symptoms may have a gradual onset and are characterized by unthriftiness, loss of flesh, slow or unsteady gait and difficulty in arising. During the course of these chronic symptoms acute urinary symptoms may appear. Sometimes the acute urinary symptoms appear in an animal that is apparently in good health and condition.

Examination of the patient usually reveals normal pulse, respirations and temperature. The rectal examination assists greatly in making a diagnosis and determining the extent of the pathological changes. This examination, in advanced cases, reveals the blader sensitive to pressure and its walls thickened. The bladder may contain one or more abscesses depending upon the type of infection. In advanced cases the ureters may be involved to an appreciable extent, when it is an easy matter to palpate the enlarged ureter and trace its course from the pelvis of the kidney to the bladder. The enlarged kidney or kidneys are detected easily by the rectal examination. Pressure upon the kidney, ureter or bladder usually induces straining accompanied by the expulsion of turbid or bloody urine or bright blood in small quantities.

Chemical examination of the urine shows the presence of albumin. A microscopic examination of the urinary sediment reveals the presence of erythrocytes, leukocytes and microorganisms, the latter sometimes in great numbers. Cultural studies of the sediment usually reveals a mixed infection, but pure cultures have been found in some cases. In the cases studied by Jones and Little, the diphtheroid organisms were always present in the urinary sediment in large numbers and in some cases were isolated in pure culture.

A positive diagnosis may be made from the clinical symptoms, the rectal examination and the chemical and microscopic examination of the urine. When the symptoms alone are taken into consideration, the disease may be confused with acute simple cystitis. Cases of simple acute cystitis are not uncommon in cows, they do not, however, present ureter or kidney changes and usually respond to treatment.

In the infectious cystitis and pyelonephritis herein described the prognosis is always grave. Death may occur suddenly from acute uremia shortly after the onset of the symptoms and at a time when the animal is apparently in good physical condition. Sometimes the course of the disease may be prolonged, the animal becoming emaciated and finally unable to stand.

### Treatment

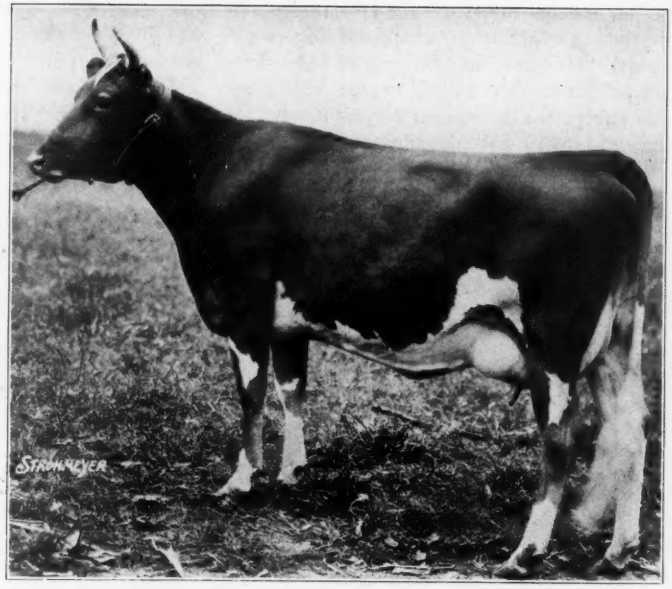
Treatment is not to be considered in cases showing extensive involvement of the urinary organs. Hutyra and Marek state "recovery of a well defined pyelonephritis has never yet been observed, although the possibility of a clinical cure is not excluded if the disease is unilateral." As the majority of of cases do not show clinical symptoms until the disease is well advanced, little can be hoped for in the way of treatment. Occasionally a cow will present symptoms of cystitis and upon rectal examination no changes can be detected in the ureters or kidneys. The writer has encountered several cases of cystitis accompanied by frequent urination, bloody urine and severe straining in which no ureter or kidney complications could be detected and, which responded to treatment with tannic acid irrigations of the bladder. Whether or not these were genuine cases of infectious cystitis or simple inflammations of the bladder we are unprepared to state as bacteriological examinations were not made. They were probably cases of simple uncomplicated cystitis.

When the examination reveals involvement of the ureters or kidneys immediate slaughter should be recommended. If ureter

and kidney complications cannot be detected the bladder may be irrigated with an antiseptic solution and the patient given antiseptics internally, preferably, by way of the blood stream.

### Case Reports

*Case I*—This case is one of specific infectious pyelonephritis in which the specific diphtheroid organism was isolated from the kidney in pure culture. It is rather unusual in that it was discovered incidental to an examination for pregnancy and although the pathological changes were well advanced at the time of discovery the animal remained in apparent good health throughout the subsequent year. Furthermore the lesions were prominent in the kidney and ureter whereas the bladder was normal on microscopic examination. This is the only case in this herd which has come to the attention of the writer.

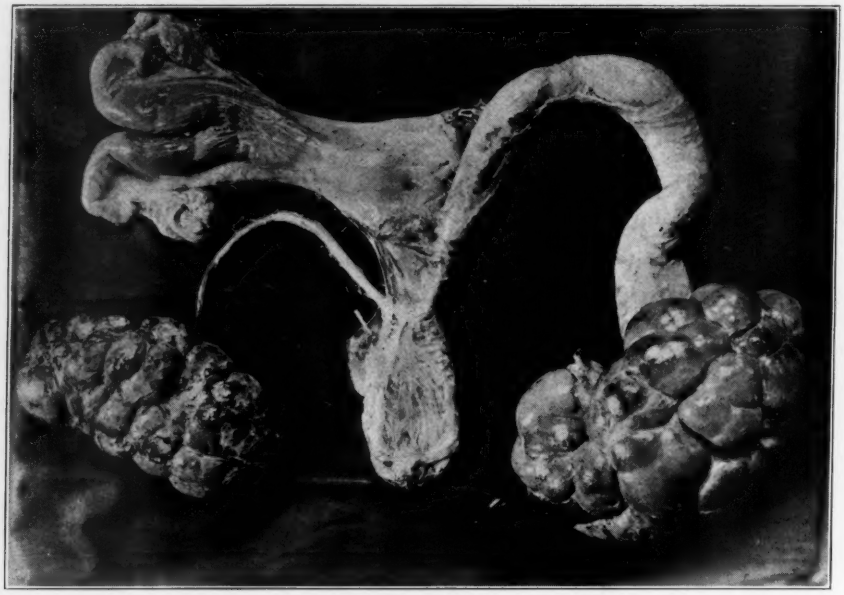



**Case No. 1. As the animal appeared when the case was discovered.**

**Case No. 1. As the cow appeared one year after the foregoing photograph was taken.**

The patient, a purebred Guernsey cow, age three years when her case was discovered, was a member of a herd of 200 animals. She gave birth to her first calf on Aug. 12, 1928 at the age of 29 months. She was born March 5, 1926. Her calving in August, 1928 was a normal one and she was placed upon semi-official test. Her production was normal, likewise her state of health, during this lactation period. She was bred several times during this lactation

period and in July, 1929 she appeared upon the list of cows to be examined for pregnancy. This examination revealed she was not pregnant. The genital organs were normal except for a retained corpus luteum in the right ovary. While palpating the genital organs via the rectum a large tube about the size of the non gravid uterine horn was detected. This tube could be traced from the pelvis of the left kidney to the bladder and was, therefore, a greatly enlarged left ureter. The left kidney was greatly enlarged. It was median in position and behind the right kidney making palpation of the right kidney unsatisfactory. A diagnosis of pyelonephritis was made. While discussing our findings the caretaker reported that a full feeding of ensilage caused frequent urination in this animal but there were no other urinary symptoms and that by reducing the amount of ensilage fed no symptoms were noted. As the cow was in good flesh, milking well and in apparent good health it was decided to continue her on test and to breed her. It is needless to state a very unfavorable prognosis was made. No treatment was given for the pyelonephritis. The corpus luteum was removed from the right ovary and a few days later the cow came in heat and was bred. In August she completed her yearly test having produced during the year 9531.7 pounds of milk and 500.7 pounds of fat in class G. After finishing her test she was removed from the test barn and placed in the main milking herd. In September she was examined for pregnancy and was found to be pregnant. Her general health continued good and on April 30, 1930 she gave birth to twin calves. She retained the placenta but made a prompt recovery. Her general condition remained good and her milk production was normal until July when it was noticed she was losing flesh and that her appetite was slightly impaired. Following this the cow began to show rapid emaciation. She was destroyed on August 22, 1930 immediately after taking the photograph which accompanies this report. The autopsy revealed lesions in the kidneys and ureters. The left kidney and



**Diseased Kidneys and Ureters of Case No. 1. Note the enormous enlargement of the left ureter.**

ureter were greatly enlarged. Nearly every lobe of the kidney contained an abscess filled with thick whitish pus. The pelvis contined pus and urine. The left ureter contained the thick pus and urine. The ureter was constricted at its union with the bladder. The bladder was apparently normal. The right kidney although much smaller than the left was diseased. The right ureter was slightly enlarged. The genital organs were normal. From the kidney pus a diphtheroid organism was isolated in pure culture. A culture of this organism was sent to Drs. Jones and Little who reported the organism appeared to be identical with the one they have found associated with specific infectious cystitis and pyelonephritis. The involved organs from this case are shown in the accompanying photographs.

*Case II*—This is another case of specific infectious pyelonephritis caused by *B. pyelonephritis* boum. It is almost identical with the preceeding case in its pathology but varies slightly in its symptomatology. This animal was a member of a herd of approximately one hundred animals. The writer has been in close contact with this herd for more than ten years and during this interval only three cases have come to our attention. As it is the practice to confirm pregnancy in every bred female in the herd and to make a post mortem examination of all animals which die it is not probable that many of these cases escaped our observation. Hence one may conclude positively that the spread of the infection in this herd has been very slow.

The patient, a pure-bred Guernsey cow, age six years, with no history of previous illness, suffered from milk attacks of colic during late pregnancy. When first observed by the writer during one of these attacks, the cow was apparently in good physical condition and within two weeks of parturition. The examination at this time revealed typical colic symptoms, the cause of which was not determined. The pulse, respiration and temperature were normal. The digestive organs were normal apparently and no abnormal changes were noted on rectal examination. A diagnosis (other than colic which is only the name of a symptom) was not made. Treatment consisted of a quart of molasses (black-strap used as dairy feed) as a laxative and one ounce of chloral hydrate by capsule. The attack of colic was of short duration, the next day the cow was apparently normal, and a few days later, April 15, 1926, gave birth to a living calf at full term. The colic attacks may or may not have been associated with the pyelonephritis which was discovered later.

In October (six months later) when visiting the herd, for the purpose of collecting blood samples for the Bang's disease test, the herdsman called our attention to this animal, stating she had been served several times and requested examination of her reproductive organs. He stated also, "the cow although milking normally was out of condition and that in coming in from pasture lagged behind the herd, she was slow in getting up, and that she frequently passed small quantities of thick urine." Examination of the patient revealed a fair state of flesh; normal pulse, respirations, and temperature; normal heart and lung sounds; and normal appetite and digestion. Upon rectal examination there was discovered a firm, non-fluctuating tube almost median in position and about the size of a non-gravid horn of the uterus. This proved to be the left ureter which could be traced easily from the pelvis of the kidney to the bladder. The left kidney was enlarged to about twice its normal size. The right kidney and ureter were not located. This inability to palpate the right kidney is not unusual, as a full rumen pushes the left kidney backward and to the right so that it is situated about median in position or it may be on the right side, behind, and at a lower level than the right kidney. When the left kidney is thus situated it is very difficult to palpate the right kidney. The bladder wall was thickened and pressure upon this organ induced straining. The uterus and ovaries were normal. A diagnosis was made of cystitis and pyelonephritis. Immediate slaughter was advised and this was carried out on October 26. The autopsy revealed lesions confined to the urinary organs. The bladder con-

tained about 100 cc. of turbid urine. Its wall was thickened and the mucous membrane inflammed. The left ureter was greatly enlarged. Its diameter was about 2.5 cm. The left kidney was enlarged, many of the lobes of the cortex contained an abscess filled with creamy, thick pus. The pelvis was dilated and filled with pus and urine. The lumen of the left ureter was filled with pus and urine. The right kidney was approximately half the size of the left kidney and upon section abscesses were found in the cortex portion. The right ureter was slightly enlarged. Photographs were not made from the diseased organs in this case, but the picture which was presented was almost identical with that of Case I. Cultures made from the pus of the kidney gave a pure culture of a Gram-positive diphtheroid.

*Case III*—Cases I and II may be regarded as chronic types of specific cystitis and pyelonephritis from the symptomatology standpoint. Case III may be regarded as an acute case of specific cystitis and pyelonephritis.

The patient, a "second-calf" pure bred Holstein-Friesian cow on semi-official test was observed to lag behind the herd when coming to the barn from pasture. The dairy barn of this herd is located upon a hill top. When returning to the barn from pasture, the herd must climb this hill. Some of the old cows in the herd experienced some difficulty in making this grade but for a young cow to lag behind is unusual. Shortly after making this observation it was observed that this cow urinated frequently, passing bright blood in the urine. Otherwise, the cow did not appear ill. Upon discovery of the bloody urine the case was called to our attention. When seen by the writer the cow was standing in her box stall eating alfalfa hay. The appetite appeared normal and the general appearance was not indicative of serious illness. The cow was in a fair state of flesh, although the caretaker reported she was loosing weight and decreasing in milk production. The cow was nearly dry and had nearly completed a 365 day semi-official test. She was not pregnant. Examination of the patient revealed normal pulse, respirations and temperature. The heart, lungs and digestive organs were apparently normal. Vaginal examination revealed normal vulva, cervix and urethra, and no pain was shown when pressure was applied over the bladder. A gum catheter was passed into the bladder, but no urine was obtained. With the catheter remaining in the blader an examination was made by way of the rectum. The first structure encountered was a firm tube about the size and consistency of a section of garden hose. This tube was traced from the pelvis of the left kidney to the bladder and proved to be the left ureter. The left kidney was greatly enlarged and estimated to be 14 inches long, 12 inches wide, and 6 inches thick. Palpation of the left kidney and ureter caused pain, straining, and the passage of bright blood through the catheter which had been left in the bladder. Owing to the great size of the left kidney, which was median in position, palpation of the right kidney was not satisfactory. The right ureter was located, but it was not as large as the left. The uterus and ovaries were normal. A diagnosis of pyelonephritis was made. The cow was placed on treatment consisting of hexamethyleneamine, one ounce three times daily, balsam copaiba and rectified oil of turpentine equal parts one ounce daily, and acriflavine, one-half gram in physiological salt solution intravenously once daily. The patient was under treatment for one week but as there was no improvement in her condition, in fact, she was failing, it was decided to slaughter her. The autopsy revealed lesions confined to the urinary organs. The post-mortem picture in this case was almost identical with that of Case I.

### Cases of Non-Specific Infectious Cystitis and Pyelonephritis

By non-specific infectious cystitis and pyelonephritis is understood those cases of inflammation of the bladder, ureter or kidney caused by microorganisms other than *B. pyelonephritis* boum. (See etiology.) These cases are characterized by symptoms of cystitis and abscess formation in the bladder. *Eberth. pyogenes* and staphylococi are re-

garded as the most important causative organisms. The infection probably gains entrance into the bladder at calving time, although one case of cystitis and abscess in the bladder was observed in a virgin heifer. This form of the disease is seen in cows shortly after calving and where there is usually a history of metritis. When the process is limited to a single abscess the tissues may succeed in the walling off process and recovery may occur. No cases of recovery have been observed where more than one abscess was present in the bladder.

*Case IV*—This case is characterized by simple abscess formation in the bladder, the absence of symptoms of cystitis and terminating in complete recovery.

Some years ago a pure-bred Guernsey cow was purchased for the University herd. The cow had freshened shortly before becoming a member of the herd. Soon after becoming a member of the herd the animal suffered from an illness which was thought to be a digestive disturbance due to over feeding of ensilage which was of poor quality. From this she made a good recovery. The cow was bred several times, but as she failed to conceive was examined for sterility. This examination failed to detect any pathological changes in the genital organs. The bladder, however, contained a thick walled abscess about the size of a small orange. No treatment was given, but the case was kept under observation. The cow came in heat at regular intervals, at which time she was bred, but she failed to conceive. During this interval occasional rectal examinations were made and no pathological changes were detected in the genital organs. It was observed during these examinations that the abscess in the bladder was decreasing in size and after an interval of about nine months it had completely disappeared. About this time the cow conceived. She remained in the herd for several years a normal breeder and producer. She was destroyed at seventeen years of age because of senility.

*Case V*—This case is characterized by simple abscess formation in the bladder, a definite relationship with pyometritis, the absence of symptoms of cystitis until the case was interferred with by an ambitious but unwise herdsman, and terminating in complete recovery.

While examining cows for pregnancy and sterility in a herd of about 100 milking cows, a cow was examined in which the last service date was about five months prior to our examination. As the animal had shown no diestrous cycles in the intervening interval she was considered to be pregnant. The examination revealed the right horn was enlarged to about the size of an 8 to 10 weeks pregnancy and contained pus. The right ovary contained a corpus luteum. Removal of the corpus luteum was followed in a few days by the discharge of a considerable quantity of pus. After evacuating the pus by removal of the corpus luteum the uterus was irrigated with physiological salt solution. One month later, examination of the patient revealed the presence of an abscess in the bladder. The abscess was circumscribed about the size of an orange and possessed a firm thick wall. No treatment was given. The caretaker was advised that in our opinion no treatment should be given and that the abscess would either be absorbed or become multiple. About two weeks later an urgent call was received to visit this patient. The cow was found to be uneasy, striking with the hind legs, straining as if to urinate and suffering considerable pain. A rectal examination revealed the bladder to be distended greatly with urine. In the urethra a piece of fibrous tissue was found which was mechanically blocking the flow of urine. A gum catheter was used to drain the bladder. After removing the urine the bladder was irrigated with physiological salt solution. Rectal palpation revealed the abscess had disappeared. It was evident the abscess had ruptured and that shreds from the old abscess wall had blocked the lumen of the urethra. Upon questioning the herdsman admitted he had been messaging the growth daily by way of the rectum since our previous visit, and that on the day before the cow started to show symptoms of retained urine he was unable to locate the growth. A few days

later the cow again showed symptoms of retained urine. The bladder was again drained with the catheter and several shreds of fibrous tissue removed. After draining the bladder it was irrigated with physiological salt solution followed by a one per cent solution of proflavine. The cow experienced no more difficulty from retained urine. The uterus returned to normal and the cow later conceived.

*Case VI*—This case is characterized by the presence of symptoms of acute cystitis and the presence of an abscess in the bladder.

The patient, a year and a half, virgin, Holstein-Friesian heifer was quartered with a herd of pure-bred heifers ranging in age from one to two years of age. She was observed by her caretaker to urinate frequently and to strain during and after the act of urination. The straining and frequent urination was not of long standing as the herd was under the close observation of a skilled caretaker. This heifer had a rather unusual history. Her dam, a very valuable cow, became seriously ill when in advanced pregnancy with traumatic peritonitis. When it became evident that death was near at hand the dam was placed under chloroform anesthesia and her calf, the heifer of this sketch, removed through the flank. The diagnosis of traumatic peritonitis was confined in the dam by demonstrating a piece of bailing wire which had perforated the reticulum. The calf, a heifer, born in this unusual manner was raised without difficulty, and at the time of showing symptoms of cystitis was normal in size. A rectal examination of the patient revealed the presence of a hard growth in the bladder about the size of an orange. Palpation of the growth induced severe straining, which persisted for sometime after the examination. As the growth appeared very hard and firm, it was believed to be a tumor and slaughter was advised. As the heifer appeared to be suffering great pain immediate slaughter was deemed the most humane course of procedure. This hasty action was regretted later after the pathology of the case became evident. The uro-genital organs were obtained from the abattoir and examination revealed the growth in the bladder to be a very thick walled abscess. The remaining organs were normal. As the abscess was well encapsulated it is probable that recovery may have taken place as it did in Case IV. The proper procedure would have been to treat the heifer with sedatives to allay the pain and await developments rather than immediate destruction of this very valuable animal.

*Case VII*—This case is characterized by symptoms of acute cystitis, multiple abscess formation in the bladder, involvement of the kidneys and a fatal termination.

In 1924, the writer was called in consultation to see a pure-bred Guernsey cow that was passing bloody urine. The patient was a mature cow, six years of age, in the fifth month of lactation and producing well at the onset of severe symptoms of acute cystitis. Examination of the patient revealed a cow in good flesh and possessing a normal appetite. She presented no symptoms other than frequent urination accompanied by straining and the passing of blood in the urine. The rectal examination found the bladder to be greatly enlarged with its wall containing many small abscesses. The abscesses were estimated to number about fifty and the largest appeared about the size of walnuts. The kidneys were not sensitive to pressure, but were increased in size. Slaughter was advised, but as the owner was anxious to try treatment, a course of treatment was outlined consisting of antiseptic irrigations of the bladder and internal antiseptics. It was not possible to keep in close touch with the case, but it was learned the cow died a few weeks later. No autopsy was held.

*Case VIII*—This case is characterized by the discovery of a single abscess in the bladder before symptoms of cystitis appeared, by the abscess becoming multiple, by symptoms of cystitis developing later, by ureter and kidney involvement and by terminating in death.

This subject was a member of a large herd of pure-bred Holstein-Friesian cattle, the same herd to which case III belonged.

The case was discovered during the routine of examining cows for pregnancy. The patient, a very valuable cow had calved normally about five months prior to our examination, and had been bred two months prior to our examination. She appeared to be in normal health, was on semi-official test and was making a good record. The examination revealed the cow was not pregnant. The genital organs were normal except for the presence of a retained corpus luteum in the right ovary. The bladder contained a thick walled abscess about the size of a lemon. The ureters and kidneys were apparently normal. The urine was apparently normal although it was not examined chemically or microscopically at this time. As the cow appeared healthy and the tissues were walling off the abscess, it was decided to let nature alone, basing our advice on previous experiences with cases of single abscess in the bladder. (See case IV.) The corpus luteum was removed from the right ovary and a few days later the cow showed symptoms of estrum and was bred. She continued to produce well, the appetite was normal, diestrous cycles did not recur and she was not examined until three months later when she was examined for pregnancy. At this time it was observed the cow was not carrying as much flesh as when previously examined. The examination revealed she was not pregnant. The bladder now contained several abscesses, and rectal palpation of the bladder induced straining and the passage of thick, turbid urine which contained pus but no macroscopic blood. A sample of urine was collected for laboratory study. This contained albumin and a mixed infection consisting of staphytococci and organisms resembling *Eberthella pyogenes*. No changes were detected in the kidneys or ureters at this examination. Up to this time the animal had shown no symptoms of cystitis and her general physical condition would be considered good. In view of our findings, it was decided to make an effort to check the infection in the bladder. Treatment consisted of daily irrigations of the bladder with physiological salt solutions by means of a gum catheter followed by introducing a quantity of proflavine (1-1000) which was permitted to remain in the bladder. The case did not respond to treatment and from this time on the cow began to show symptoms of cystitis as indicated by straining and frequent urination. The treatment which the animal was receiving failed to check the suppurative process, she lost weight and gradually became weak and emaciated. Death resulted from uremia three months after treatment was started. The autopsy revealed a bladder containing a mass of abscesses. The ureters were enlarged and their walls thickened. Both kidneys, although not enlarged, contained multiple abscesses. *B. pyelonephritis* boum, the cause of specific infectious cystitis and pyelonephritis, may have been the primary infective agent in this case; but efforts to demonstrate its presence failed. If this was a case of true specific infectous cystitis and pyelonephritis, the secondary invaders played a very prominent rôle.

## RELATIVE PREVALENCE OF DISEASES IN MEN AND WOMEN

The predilection of the following diseases to attack men as compared to women, is:

Pneumonia, 50 to 1,
Amebic dysentery, 15 to 1,
Diabetes, 3 to 2,
Gout, 46 to 1,
Gastric ulcer, 5 to 1,
Sero-fibrinous pleurisy, 5 to 1,
Pernicious anemia, 2 to 1,
Angina pectoris, 6 to 1,
Alcoholism, 6 to 1,
Tabes, 10 to 1.

The prevalence of the following diseases among women as compared to men, is:

Influenza, 2 to1,
Gallstones, 4 to 1,
Movable kidney, 7 to 1,
Exophthalmic goitre, 7 to 1,
Myxedema, 6 to 1,
Migraine, 6 to 1,
Hysteria, 7 to 1.

Hemophilea is a disease of males exclusively and chlorosis of females only.

# Subcutaneous Emphysema of the Cat

By RAYMOND F. WITT, Columbus, Ohio
O. S. U., '31

SUBCUTANEOUS emphysema occurs commonly in the horse and ox, and in exceptional cases, in the dog, but despite wide search I have been unable to find the condition in the cat described in any text, or to learn of any case in a cat, that had been presented for treatment.

The cause may be traumatic or occur as a result of gas forming bacteria being present in the subcutaneous tissues. A foreign body in the trachea or esophagus, such as a bone, piece of glass, wood or any other object that has sharp projections or edges, may puncture the wall making an artificial tract between the trachea or esophagus to the subcutaneous tissues, thus allowing an escape of gas into this region. Or a broken rib might penetrate the lung, allowing a diffusion of air throughout the tissues. A gas forming organism would produce such a condition as this by gaining entrance through the skin. For this reason, malignant edema might be considered.

I was fortunate in seeing a case of subcutaneous emphysema in a cat brought to the university clinic in a very depressed condition. It would not eat or drink, and was extremely sensitive to palpation around the submaxillary and pharyngeal regions. There was also a slightly swollen area on the dorsal surface of the head. This condition had been present for three days. The owner had noticed an enlargement in the region of the pharynx, which he manipulated and by exerting a little pressure, caused the abscess to break, and discharge large quantity of pus and dirty grey material, probably necrotic tissue. The animal was somewhat relieved for a while, but the following day was again in the same deplorable condition, and was brought to the clinic.

At our first examination of the case, the pulse was 180, respiration 26 and temperature 104.4 deg. F. The emphysematous condition was somewhat more extensive than the owner had stated, involving the surface of the entire head and a small portion of the back. The swelling at the pharyngeal region was soft and fluctuating. Although very inactive and dull, the animal resented any palpation of the swollen areas. Extreme care was taken in the general examination but we could not find any evidence of a contused wound or fracture of a rib. The hair coat was very full and might possibly have covered some minute puncture into the thoracic cavity. The animal showed some difficulty in breathing but an examination of the buccal cavity showed no immediate cause for the condition. The handling produced some excitement, so the animal was allowed to rest for a few hours under observation.

Continuing the examination, the neck was extended so as to form a straight line from the mouth to the stomach. A long flexible probe was passed through the esophagus to the stomach, without encountering a foreign object. A larger metal catheter was then used for the same purpose, and again no obstruction was found. During this examination, a great care was exercised to assure the animal's breathing, also to prevent a rupture of the esophagus or stomach, or to cause any injury to the more tender structures of the posterior part of the oral cavity.

The following day, the animal showed slight improvement, although the respirations had increased to twenty-eight per minute. The pulse and temperature were somewhat lowered, 160 and 103.7 deg. F. respectively. The condition was now more generalized, being more pronounced at the top of the head and extending the full length of the back to a marked de-

gree, extending over the whole body, with the exception of the legs. At this time the animal was less sensitive to the touch. The skin had a crepitant sound on palpation but was not taut. A re-examination did not disclose anything new, upon which to base a diagnosis.

Through a very small opening made with a needle, in the lower part of the body, a few drops of exudate were obtained and four agar stabs made. Two were exposed to the air and the remaining two were sealed airtight. In thirty-six hours, the sealed tubes showed growth plus a small amount of gas and the open tubes showed growth. Two broth cultures containing a little blood were also inoculated with this same material and both were sealed with vasoline. In due time, both showed a slight gas formation having a extremely offensive odor. A seventh agar slant of mixed sugars showed an acid formation and much growth, which was white and raised above the surface of the media. Two agar plates were also inoculated from a broth culture of the abscess discharge. No dilutions were used. A plentiful growth of streptococci and staphlococci resulted, in thirty-six hours at 37.5 deg. C. Two smears were made on slides and stained with Löeffler's blue. They presented the characteristic chain formation of the streptococci and the clumped appearance of the staphlococci, also short chains of medium size rods which seemed of little importance.

The object of the bacteriological work was to determine the presence or abscence of gas forming bacteria. Although there was gas formed under anaerobic conditions, it was insufficient to cause extensive inflations seen in this animal. The theory of gas forming organisms being present was discarded.

Another day brought a rise in temperature, 105 deg. F., also pulse, 170, and respiration, 30. The animal was again examined and the lesion in the region of the pharynx was thoroughly cleaned. The abscess seemed to be gaining in size, but was rather hard and was not opened.

Sometime during the night the abscess broke and was discharging profusely in the morning. It left quite an opening and in probing for possible fistulous tracts, a piece of wood, one and one quarter inches long and one quarter inch wide, very sharp and flat, was found extending downward and backward, from the soft structure between the gums and just below the tongue, to the region just anterior and involving structures adjacent to the pharynx. It was removed and the area cleaned with a weak bi-chloride solution. A probe was then easily passed through the abscess into the oral cavity. The wound in the mouth was situated so that it was easily overlooked. The animal's appetite had diminished, but was considered fair through the ordeal so far. When it drank milk, none of the fluid entered the fistulous tract, so well was it hidden.

The temperature quickly dropped to 102 deg. F., and the animal looked brighter than it had for days, although it was still very depressed. It moved only when urged, and then very slowly, and painfully, with a difficult, swaying, unsteady step, eyes wide and staring, almost unseeing, the pupils widely dilating and contracting. When rolled on its back, there was much difficulty in righting itself. The animal frequently extended its right fore paw back of its ear and held it in this position for some time. The patient showed no interest in its surroundings. The emphysematous condition continued neither showing improvement or getting worse.

For the next few days, the symptoms varied in intensity, the temperature fluctuating from 102 deg. F to 106 deg. F. The wound continued to suppurate and granulate, gradually filling in. It was swabbed daily with five per cent Mercurochrome. After 10 days the tissues appeared to contain a little less gas but the condition was not improved enough to hope for recovery.

When the wound in the pharyngeal

region had practically healed, the animal was discharged from the hospital, with a none too favorable prognosis. This writer looked up his patient a few days ago and was delighted to find the animal in a normal and apparently healthy condition. All evidence of the wound and inflation of the tissues having disappeared. There is now a slight change in the voice, due possibly to injury to the laryngeal structures, and the animal seemed to have acquired a timid disposition. Occasionally there is a slight dry cough, which does not seem indicative of anything serious.

This kitten was very playful and had the habit of picking up sticks and running around with them in its mouth, also biting off splinters and chewing them. The owner has not observed this since the injury. Had we known of this last bit of history, a diagnosis might have been more easily reached.

## EVERSION OF THE UTERUS IN SOW REQUIRES AMPUTATION

A correspondent asks, in the March issue of VETERINARY MEDICINE (page 87) as to the prevalence of eversion of the uterus in the sow. I have seen this condition three times in the past ten years. Strangely enough, two of the cases were seen in the same week. I have seen also on two occasions, complete protrusion of the gravid uterus through a rent in the lower wall of the rectum. All of the pigs were intact within the horns of the uterus.

In my opinion, the treatment of eversion of the uterus in the sow does not hold out much hope. The uterus cannot be returned as in the cow and it only remains to attempt amputation.

If the sow is fat, I advise immediate slaughter, but if the owner is willing to take the risk, I amputate the organ. There is tremendous amount of surgical shock following such an operation and one has to take suitable precautions to prevent or treat such phenomena.

Frank Chambers, F.R.C.V.S.
Wolverhampton, England.

## TREATMENT OF EVERSION OF THE UTERUS IN THE SOW

In the March issue of VETERINARY MEDICINE (page 87), the question is asked: "How common is eversion of the uterus in swine?"

I don't know how frequently this condition occurs in other sections, but in this section, I see it from time to time, and have treated altogether quite a number of cases.

My experience has convinced me that sows will tolerate more mishandling, lacerations of the organ and exposure than will any other animal afflicted with eversion of the uterus.

Most cases of eversion of the uterus in sows will recover. However, if the uterus is in bad condition and the animal not a particularly valuable one, I advise amputation as the best thing to do. This operation is very simple in the sow and is ordinarily attended with good results.

I recall vividly my first case of eversion of the uterus in the sow. There was a complete eversion. The uterus was covered with hog yard filth and was greatly lacerated. The animal was placed on a sloping barn door with her head downward. The uterus was cleansed as well as possible and chloral hydrate was administered per rectum to stop straining.

As the pelvis was too small to permit the introduction of my hand, I was for a time unable to get the everted organ back into place and get the kinks out of it. In looking over my instruments in my case, and trying to figure out something that could be improvised to help me, I came upon my equine balling gun. This instrument was wrapped with dry sterile bandage from end to end and the bandage left dry. The business end of the gun was then placed on the bifurcation of the uterus and with my fingers in the rings of the gun, it was a very easy matter to return the uterus which adhered very well to the dry bandage in which the balling gun was wrapped. The balling gun was left *in situ* in the uterus

until the bandage became moistened and then was carefully withdrawn.

Since that first case, I have never looked for a better instrument for returning the uterus of swine. However, I now use ether instead of the chloral as it is a better agent to stop the straining. In fact, in straining the animal will often expel the chloral solution before it has become effective.

As after treatment, an enema is usually indicated and a laxative, with a selection of feed that will keep the animal's bowels loose for several days.

Richmond, Virginia. H. T. Farmer.

## PHOSPHORUS DEFICIENCY IN A BOAR

The accompanying photograph is of an eleven month old boar. This boar was apparently in good health up to three or four months ago. Ten sows that were bred to him are all about ready to farrow now. At no time has this boar had a good appetite and at the present time he eats very little. The ration provided consists of ground bar-

ley, oats and flour middlings and buttermilk.

There is no history of injury and he has been carefully handled. In the last three years, five good boars have been purchased and put in the same lot and they have all gone wrong, one of the three appeared to have the same malady that this one has.

During the past few years, several good pigs have been produced and at this time there is about thirty sows that were supposed to be in good condition. However, on inspection, they were found to be lame.

This boar is very lame, especially in the front legs. When made to stand, he places hind legs far forward as shown in the picture and will fall on his nose to prevent putting weight on front legs.

From the history and description, it is a little difficult to make a positive diagnosis. However, it seems probable that the condition is a phosphorous deficiency or rickets.

## SWINE INFLUENZA

Swine flu was first recognized in 1918 and according to available records the disease as a distinct entity was first identified in Iowa by J. S. Koen. Since 1918 this malady has prevailed more or less continuously, but particularly during the fall and winter in the corn belt states.

The causative factor has not been positively identified, however. Shope of the Department of Animal Pathology of the Rockefeller Institute has demonstrated that it is possible to transmit the disease by a filtrate from suspensions of tracheal exudate and lung from diseased swine. The disease induced by the filtrate varies with different strains of virus. In addition to the filtrable virus a micro-organism similar to the Pfeiffer's bacillus has been found constantly in field cases of diseased swine.

These bacteria have not been found either in healthy swine or in swine in which the disease has been produced by the filtrate.

Recently isolated cultures of the Pfeiffer like micro-organism may when introduced intranasally produce a disease which may be quite similar to the natural disease but differs from the natural disease in that it is not contagious. Old cultures of the Pfeiffer like bacillus are not pathogenic. However, when small quantities of the nonpathogenic cultures are injected simultaneously with filtrate, typical cases of swine flu develop.

Thus, experimentally, Shope has apparently demonstrated that the primary cause of swine flu is a filtrable virus. The constant finding of the Pfeiffer like bacillus and the apparent increased pathogenicity of the combination of filtrable virus and this bacillus experimentally must not be overlooked and it seems probable that the filtrable virus and the bacillus act synergistically.—*Science*, 73-186.

# Anemia of Suckling Pigs

I WILL discuss this subject from the viewpoint of the practitioner only.

This is not a new disease, or a disease but recently recognized, although some of the bulletins that have appeared recently on the subject would lead one to believe that it has only recently made its appearance.

Too much stress cannot be placed on the fact that the anemia is merely a symptom of a condition that affects the pigs. A practitioner cannot treat the blood picture alone. He must treat the condition. To treat the blood picture of anemia as a basic condition would be analogous to applying ice to a thermometer on a hot day to cool the weather. Our treatment must be directed to the removal of the cause. The drop in the hemoglobin content of the blood of pigs in the first few days after birth is a physiological phenomenon that occurs generally in young mammals, and is accentuated in pigs because of their extraordinary growth. The increase in weight of young swine is unparalleled in the whole animal kingdom.

The difference in the incidence of anemia in pigs farrowing early and pigs farrowing late in the season is due solely to a difference in the amount of exercise that the early and the late farrowed pigs get. Litters closely confined in pens, litters that lie in the bed because of inclement weather, if the sow gives an abundant supply of milk, grow with extraordinary rapidity and develop fatty degeneration of all tissues, but particularly of the liver. Mechanical pressure on the blood vessels and a lack of exercise interferes with the circulation, overworks the heart and lowers its nutrition. It is futile to talk about the treatment of such pigs. By the time there is clinical manifestation of the disease, the liver, perhaps also the heart, is irreparably damaged. Such pigs never make good hogs. A common symptom of this impaired circulation is gangrene of the tail and tips of the ears. Every experienced hog raiser knows and will tell you that a pig, the tail of which dries up and drops off, will never make a good hog. They have learned this from experience.

The dilated heart due to the over exertion of forcing the blood through the fatty degenerated tissues, is the cause of the thumps that is given as a prominent symptom of anemia. The heart dilates until it fills a large part of the thorax, compressing the lungs to a degree that they cannot function normally.

Diarrhea is frequently given as a symptom of anemia. It is, but it is one of the later symptoms. Constipation always precedes it. The constipation is followed by a bacterial growth in the retained feces, enteritis and diarrhea.

Just what causes the anemia, the changed blood picture, is uncertain. Likely it is due to bacterial products absorbed from the intestine. Fatty degeneration of the liver always occurs but is found on autopsy only when death occurs in the acute stage. Later, there is cirrhosis of the liver. The fatty degeneration of the liver is not the result of the anemia, but the cause of it. The liver has a profound influence on the blood. Liver, as you know, is the common recognized treatment for anemia in the human. The liver is greatly concerned in the manufacture of the blood, the hemoglobin being manufactured from the billirubin and the billiverdin in the bile. Fatty degeneration of the liver lessens the amount of bile secreted and when there is less bile, there is less of the bile pigments and consequently less of the hemoglobin produced. Cirrhosis of the liver sets in when the anemic pig is about five weeks of age.

Nutrition of course is concerned along with lack of exercise in causing the fatty degeneration. Different animals exhibit different tendencies toward tissue proliferation. In the horse, as all will agree, the tendency is to the proliferation of fibrous tissue. In the hog, as everyone knows, the predilection is for the development of fatty tissue.

Every farmer knows that anemia in pigs is not a disease of the litters of gilts or of poor milkers. We do not see it in Tam-

*Notes from an address by C. C. Hastings, Williamsville, Ill., at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

worth swine nor so much in the Yorkshires as in breeds with a greater tendency to putting on fat. Notwithstanding pigs are farrowed earlier now than formerly, there is less of this disease in this state now than there was 20 years ago when our swine were largely Berkshires and Poland Chinas. The popularity of bacon type of hogs has reduced the prevalence of anemia in pigs.

For at least half a century, and I doubt not longer, the well-informed, successful swine raisers in this state have been perfectly familiar with this condition recently termed anemia in pigs; have known its cause and the means of its prevention. The fathers of the present generation of swine raisers told them it was necessary to exercise pigs to keep them from getting too fat and pigs not inclined to exercise on their own account, must have forced exercise, that is the pigs must be driven up and down their runway in inclement weather. The sow must be turned out of her nest and made to wander about with the pigs following her in nice weather.

The name anemia is extremely misleading for this condition. It describes only one symptom and that by no means the most important symptom. Its prevention is simply a matter of good swine husbandry. Successful swine growers know that pigs must not gain in weight, they must not gain a single fraction of an ounce, in the first ten days. This is equally true of every young animal. All good farmers who use central farrowing houses provide forced exercise for their pigs for the prevention of anemia, but they don't call it anemia. They say to prevent them from getting too fat, and that is the basic condition. The anemia is but a symptom, the blood picture a result of the overfeeding and too rapid development of the pig, which in turn is due to lack of exercise and overfeeding.

Treatment is impracticable after the disease is established. True, many of the pigs will live if treated. A good many of them will live whether they are treated or not, but the farmer is better off if all affected pigs die. They never make a profit, they never pay for the feed they eat from that time on. The administration of the mineral salts is particularly futile in that it improves only the blood picture and improves that only temporarily.

The publicity that has been given to anemia in pigs has helped no one but the nostrum vender. It has placed in his hands his best weapon. He stresses little else in his sales talk. His pernicious activities based on the findings of certain research workers and the publications of certain experiment stations has done a great deal of damage to the swine industry. It is the duty of the veterinary practitioner to curb the pernicious activities of the nostrum vender as much as he can, and these bulletins that have been published on anemia and particularly the Wisconsin bulletin has made this task harder.

It is a strange thing that those who have set out to investigate losses in pigs should find fault with his food, the only natural thing in the life of the young pig. Everything else that enters into the life of the young pig is artificial. Only his mother's milk is the same as it was in the state of nature for the wild hog. The nearer we approach the natural environment of the wild hog the better will we find our domestic hog adapted to his environment. The sow's milk is the only thing in his environment that is natural, it is about the only thing in his environment that we don't have to look into for trouble.

If our experiment stations who have been spending time and public funds on the investigation of anemia, had spent their time and money in informing the small minority of swine owners who do not know it, that exercise is necessary for young pigs, and that they will die or suffer a serious disease if those farrowed early are not permitted or forced to exercise; they would have done the swine industry some good instead of harm. In having placed in the hands of the nostrum vender one additional argument for abstracting money from the swine owner, they have done the swine industry distinct and costly disservice.

Much is made of the fact that the disease occurs in the highest percentage in pigs kept on concrete floors. Of what value can

such information possibly be when every swine owner and every swine breeder, to say nothing of every practicing veterinarian recognizes and has long recognized that pigs and cement just do not go together? Six weeks on cement is the limit even for larger hogs. Pigs will not stand it near this period. The serum producers long ago learned that they could not finish out even their test pigs on concrete floors. Why should any one be trying to find out now whether 40% or 44% or 99% of the pigs kept on a concrete floor will die of anemia or anything else? Wouldn't it be far better for research workers to delve into some of the innumerable swine problems for which we do not know the answer?

Any practitioner in my locality can suggest an ample field for research in swine problems. The practitioner does not need to be told that young pigs need exercise, nor does the swine owner any more than they need research to tell them that a pig normally has four legs.

Every practitioner has seen anemia just as bad and just as frequently in the individual farrowing house set away out alone on the pasture as he has seen it in the central farrowing house, provided the sow was one of those old lazy ones that would not get out of the nest. The disease occurs in pigs that lie in the nest when they should be playing. It occurs in those that get a bountiful supply of milk and grow unduly fat, and the less they play the more they eat, and the more they eat, the less they play.

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## HUMANE CASTRATION OF COLTS

Early in the history of the world, castration, in some crude form, has been the means employed for the purpose of taming and controlling male animals used not only as beasts of burden in the service of man, but also as a means to improve the quality of their flesh for food purposes. As a consequence the necessity of this operation is its justification.

The veterinary surgeon today has at his disposal a number of different methods of operating upon colts, but the one most generally used and favored in this part of Canada is the operation with the animal remaining standing. Very few owners of colts want a general anaesthetic used, for two reasons. Firstly, a general anaesthetic requires the patient being thrown to a recumbent position which is attended by a certain amount of risk. Secondly, the services of a second veterinary surgeon is necessary as an anaesthetist.

During the past two or three years the writer has used a local anaesthetic when castrating colts in the "standing position." The method, has so far, proved very satisfactory, not only to myself but also to owners who are usually present at the operation.

The use of the local anaesthetic was first demonstrated to me while attending the Royal College in London, England, and the technique used is as follows: Instruments and materials required are: the twitch, 5 cc. record hypodermic syringe, long sharp hypodermic needle, 4 cc. of a 2% solution of Butyn, castrating knife, emasculator, tincture of iodin, germicidal soap and absorbent cotton.

The colt is prepared in the usual manner and secured by halter and the twitch applied. The scrotal area is washed with hot water and soap, dried and painted with tincture of iodin. The operator standing on the near side of the patient, grasps the left testicle between the thumb and fore finger of the left hand, drawing it well down into the scrotum. With the hypodermic syringe in his right hand, the needle is introduced into the spermatic cord at its most proximal point. The cord is then injected on the right side with the operator standing on the off side of the patient. Two cubic centimeters of the Butyn solution is injected into each cord. The twitch may then be removed and 20 minutes allowed to elapse before commencing to operate. The surgical area will be found completely insensible to pain and the operation may be continued to its conclusion without the usual apprehension which attends castration in a fully conscious patient.

Toronto, Ont. George Cairns.

## A CASE OF DYSTOCIA IN THE COW

History: Guernsey cow, four years old. Aborted in September, 1929, and then failed to breed. She was examined by a local veterinarian but the results were negative, and on February 15, 1930 the animal was brought to the attention of the staff of the Clinic of the College of Veterinary Medicine, Ohio State University. Examination revealed an abscess located along the dorsal wall of the cervix, mostly in the pericervical tissue. The pus was drained out by passing a metal catheter through the cervical wall, and dilute Lugol's solution was injected into the cavity.

The case was not seen again until February 21, 1930. The drainage opening into the cervix had closed and a large abscess was still present. The owner was advised to bring the cow into the Clinic for further treatment. This was done March 5, 1930.

On March 11, drainage was provided by an incision through the anterior vaginal wall. A great deal of hemorrhage was encountered and the cavity had to be packed with sterile gauze to control the bleeding. The case made an uneventful recovery and was pronounced ready to breed. The cow was later bred and conceived. The period of pregnancy was normal until the cow was due to calf, January 1, 1931. She labored for some time to no effect and the owner called the Clinic ambulatory service. Doctor Krill, answered the call and took me with him as an assistant.

It was a posterior presentation, and after attaching the chain to the rear legs, we attempted to aid the delivery of the calf with three men applying traction. When this failed we tried mechanical means of greater traction. The rear legs and pelvic portion would pass through the cervix but no amount of pulling would dislodge the rest of the calf. Doctor Krill, on palpation, remarked that the abdomen of the fetus was distended with fluid to a great extent. He incised the abdominal wall of the fetus just anterior to the external angle of the illium. With this accomplished, the calf seemed to flow out, accompanied by about five gallons of a light amber colored liquid. The cow came through very nicely and was, except for being weak, practically normal in a few days time.

**Calf with abdomen filled with water for photographing.**

### Autopsy Findings in the Calf

Upon autopsy the calf was found to contain about a gallon of an amber colored fluid in the peritoneal cavity. This was in addition to certainly five gallons that escaped during delivery. There was a marked edema throughout the subcutaneous tissues, but most apparent in the ventral abdominal region. The heart, liver and kidneys were normal in appearance.

The urachus was vestigial and did not extend through the umbilicus. The bladder was immensely enlarged, being about a foot in diameter, and was distended with urine. To all appearances the calf had not been dead more than twenty-four hours prior to delivery. The remarkable distension of the abdomen can be seen readily in the accompanying illustration.

Thomas P. Nankervis.
Columbus, Ohio. O. S. U., '31.

# Avian Tuberculosis Control in Illinois

By H. D. CHAMBERLIN, Belvidere, Illinois
Illinois State Department of Agriculture

ABOUT a year ago, the State Department of Agriculture changed somewhat their policy in conducting their investigations in regard to the prevalence of avian tuberculosis in the flocks of chickens and herds of hogs in the state. The new plan in our opinion has been accomplishing more good results at a minimum cost than any plan we have used heretofore. The plan is to employ all of the competent accredited veterinarians in the county where we are working whom we can get to devote at least a part of their time to avian tuberculin testing.

One of our veterinarians goes with the local veterinarian and instructs him in the technique we have found best suited to the results we are striving to attain. We try to select from 10 to 20 farms in each township, the owners of the flocks being those who agree to help us in every way to clean up their flocks if they have reactors and who will follow our suggestions as to remodeling their coops, if necessary to get good results, and who will follow also a plan of strict sanitation and remove nearly all, if not all, of the old chickens from the flock each year. We also test the breeding hogs on the place at the same time, using both the avian and bovine strain of tuberculin.

Our plan is to use these selected farms as demonstration farms and flocks; showing how flocks can be freed from tuberculosis and remain in a comparative tuberculosis-free state, under the plan recommended by the department.

The use of local veterinarians, that we are able to interest in the chicken disease control work, has been one of our greatest helps in our work. When the flock which has been tested by the department is one of the clients of the veterinarian, he should and generally does try to watch the condition of the flock and the coops and surroundings after testing and encourages a strict sanitation, knowing the good results which will be obtained, and by doing so he comes in much closer contact with the flock owners, which will work greatly to his own advantage, as well as to the advantage of our department.

The department realizes the impracticability of testing all of the chickens in the state on account of the great expense, and for many other reasons. But by testing a number of flocks in each neighborhood and getting those flock owners to so handle their flocks that they will be able to maintain clean flocks, and by using those flocks as object lessons in a campaign of education to the others, we have great hopes of getting fine results.

The results we have obtained on a great number of farms has given us this encouragement. Showing the herd owner the results of the infection spreading to his herd of hogs has been of great help in getting him to provide better coop conditions. The remark is often made by the owner that he had been promising his wife to provide better conditions and help to maintain them in better sanitary condition, but he had failed to do so on account of many reasons, but upon being shown the infection in his herd of hogs, due to the infection in the chickens, he is much more interested in helping clean up and keep clean the flock.

When we employ the local veterinarian in this work, we try to have him test 800 fowls a day and the breeding hogs on the farm. Of course this is governed to a great extent by the size of the flocks, road conditions, etc.

The tuberculin testing of chickens, to become practical even in good flocks of chickens, must be done at the very lowest cost per fowl possible, consistent with good work. In addition the necessary time must be taken by the veterinarian to show the poultryman the necessity for proper housing of his flock, clean quarters, plenty of floor

* Presented at the Twelfth Annual Veterinary Conference, University of Illinois, Champaign, Feb. 10-12, 1931.

space per bird, good ventilation, plenty of sunlight, dropping boards, clean water, clean ground and, in fact, good sanitation and culling as near as possible all old birds from the flock every year.

Great care must be used in unduly exciting the flock at the time of testing it and over-crowding must be guarded against, as losses will be had by overheating and smothering. When we first started the work, the manner of handling and catching the birds was very crude and we now often wonder that our losses were not greater both by death and loss of egg production than they were. Now, by the system we are using, we have no complaint from even the most critical after one of our men has handled a flock. The veterinarian who is the most successful in handling a flock is the one who can adapt himself best to the various conditions presented by the very many different kinds of coops, etc. But our plan, in a general way, is to drive the fowls gently into small crate coops, which hold from 40 to 60 chicks—coops which we have devised —with slat covers, and doors in the top where the helper catches the fowls with very little excitement and hands them to the veterinarian.

As to the technique of the injection, we have tried all manner of ways of holding the fowls, both by an assistant and by the veterinarian himself. Most of the men who have had any great amount of experience in our department are seated while doing their work. We now use the lower edge of the wattle as the point of injection. We find one can make a much faster and accurate injection at this point and reading is simplified by the absence of the traumatism common where the injection is made on the side of the wattle. The different veterinarians on our force have somewhat different preferences in the ways they wish the helper to hand the fowl to them to save time. While these things may seem unimportant, remember every lost motion you make slows you up. We find, if we can have the fowl handed to us in whatever way we can best work, whether we are standing or sitting, we are able to make the injection before the fowl makes any resistance. Very often one resisting fowl will require more time for a proper injection than three non-resisting ones. The character of your needle, as to gauge, length and bevel has a great influence on the time required and the character of your injections. By the use of the methods we are now using, our veterinarians are injecting, in a very accurate manner, more than twice as fast as they did under previous methods.

When we first started the testing of flocks, the disposition of our reactors was one of our problems. We have destroyed our reactors when there were only a few on the farms. We have slaughtered them and helped the farmer dress them for market, as many as a hundred on a farm—passed on them as to their food value and then used all of our persuasive powers to have hotels and restaurants buy them of him. We early saw, if we were going to get the poultrymen of Illinois to test very many flocks, we had to make some arrangements with the poultry packers whereby we would be able to get a fair price for our reactors which were passed as fit for food. We have met with the most splendid cooperation from the poultry packers of Illinois and they have shown great fairness in the prices paid the poultryman for his reactors. One of the developments of our work with the packer has been to dispel the idea in his mind that fowls in which the abdominal cavity has been opened would not remain fit for food. We were able to persuade one of the most progressive superintendents to draw the fowl, remove head and feet, wipe dry and freeze and now such fowls are on the market in individual containers with the net weight and grade stamped on the box and are the finest product of the packer. This packer says he will have reached his goal when he will be able to have the government station a veterinarian at his plant so he will be able to have the little blue stamp of the government certifying to their inspection.

As our investigations are conducted during the entire year, we decided upon September 1 as the date to change our classification from young to old. Because of this

chickens classed as young are penalized as chickens tested in July and August of the year's previous hatch of March and April are nearly one and one-half years old. Even then, the percentage of infection in those classed young chickens is very small and you will notice the marked reduction of infection of the young in highly infected counties. As this investigation has got sidetracked somewhat from its original intention, due to the great demand from the poultry industry for a good trial of area testing, still it has furnished good statistics upon which to base the department's future policy in combating avian tuberculosis. The results our department has had is confirmed by the work done in other states. If we can bring the facts forcibly enough to the minds of our poultry producers, in my opinion, we can eradicate avian tuberculosis from the flocks of Illinois in a short time. It consists of removing from the flock every year all old fowls, relying upon early hatched chicks for our winter layers; a thorough culling of all of our unthrifty, young stock in the early winter; stringent sanitation; good coops, with plenty of sunlight, vetnilation and floor space to avoid overcrowding; keeping the quarters dry with proper water containers up from the floor, and dropping boards frequently cleaned; dry litter on the floor—soil rotation, wherever we are able to obtain it—giving the hen good quarters; starting with infection removed from the farm and pursuing the above plan of "giving the old stock a ride"—and confining our testing to the better class of chickens which the owner wishes to retain longer than a year for the production of very early fertile eggs for hatchery purposes and to preserve show stock and high laying strains of valuable fowls. The tuberculin testing of such, we think should be greatly encouraged, as no one is able to cull out all the generalized cases in old fowls, as we have very often demonstrated to the amazement of the very best judges of chickens. It is the general run of farm flocks which we are making our recommendation upon and the Department of Agriculture of Illinois is going to continue to carry on investigations in some of the counties where we have worked to see the results of what has been done. But the department will very likely devote a large part of our work in conjunction with the veterinarians, hatcherymen, poultry societies, county agents, agriculture teachers in high schools of the state, in bringing the results of our work before them in trying to improve the condition of the flocks by so doing.

The results of the testing in 28 counties of Illinois for the fiscal year from July 1, 1928, to June 30, 1929, was as follows: Number of flocks, 8,878. Number chickens tested, 1,278,942. Number old chickens tested, 487,717. Number young chickens tested, 791,225. Number passed test, 1,226,-597. Number reactors, 52,345. Old reactors, 42,471. Young reactors, 9,874. Accredited flocks, 4,663. Passed fit for food, 34,413. Condemned, 17,932.

58% of all chickens tested were old.
62% of all chickens tested were young.
96% of all chickens tested passed.
4% of all chickens tested reacted.
81% of all reactors were old.
19% of all reactors were young.
66% of all reactors passed for food.
34% of all reactors were condemned.

Results of tuberculin testing flocks of chickens and herds of hogs in the five counties from June 1, 1930, to February 1, 1931, conducted by Department of Agriculture, assisted by local veterinarians.

**Totals of Five Counties Tested June 1, 1930 to February 1, 1931**

**Chickens**

| | |
|---|---|
| Flocks tested | 1,288 |
| Flocks clean | 537 |
| Flocks infected | 751 |
| Chickens injected | 190,215 |
| Old chickens injected | 65,047 |
| Young chickens injected | 125,168 |
| Chickens passed | 180,165 |
| Chickens reacted | 9,350 |
| Old chickens reacted | 7,693 |
| Young chickens reacted | 1,657 |
| Per cent of reactors | 4.9 |
| Per cent of old reactors | 11.8 |
| Per cent of young reactors | 1.3 |
| Reactors passed for food | 6,366 |
| Reactors condemned | 2,655 |
| Reactors not posted, died, etc. | 329 |

| Hogs | |
|---|---|
| Herds injected | 655 |
| Herds clean | 412 |
| Herds infected | 243 |
| Hogs injected | 4,906 |
| Hogs reacted | 622 |
| Hogs reacted, avian | 595 |
| Hogs reacted, bovine | 17 |
| Hogs reacted, both avian and bovine | 10 |
| Per cent hogs reacted | 12.7 |
| Per cent hogs reacted, avian | 12.1 |
| Per cent hogs reacted, bovine | .34 |
| Per cent hogs reacted, both avian and bovine | .2 |

The average loss of all hogs slaughtered last year under federal supervision by retentions was 5c per head, 46,688,860 hogs@5c, approximately $2,500,000.

The relation of avian tuberculosis in our opinion is very clearly shown in the results of testing of the breeding hogs in the several counties in relation to the percentage of retentions in the markets where the hogs of these counties naturally would be slaughtered. Remember in conducting these tests the breeding hogs are only the ones which are tested and will average older than the general run of hogs slaughtered—hence have had a greater opportunity to become infected and would very likely have now developed lesions. It is generally agreed that the greater proportion of the retentions of portions of the carcass of swine for tuberculosis is due to avian infection. The percentage of retentions at Chicago in 1922 was 20.3—in 1930, 12.8—a reduction of 37%. The hogs in the Chicago territory, Champaign county, 936 injected, reactors, 12.9%; Adams county, hogs injected, 864, reactors, 14.8%; Knox county, hogs injected, 854, reacted, 13.8%; Bureau county, hogs injected, 851, reacted, 15.3%. Total number breeding hogs injected in Chicago territory, 3,405—487 reactors—14.3% reactors, which you will see is 1.5% higher than the regular slaughter of those yards. In the East St. Louis yards, the percentage of retentions in 1922 was 10.4 and in 1930 was 10.8, an increase of .4%. The results of testing 1,401 breeding hogs in Greene county, an East St. Louis market, was 9% for all reactors and 8.2% for avian only reactions. We had a 0.5% of bovine reactors in Greene county and 0.2% of a combination avian-bovine reactors in Greene county. Here the percentage was lower than the general run of the St. Louis market, but in this county the test was conducted during the month of January of this year, hence the percentage of young hogs was greater.

We are of the opinion that the veterinarians of the state and the poultry industry should bring to the attention of the people and the different branches of the government the necessity for the freeing the flocks and herds of avian tuberculosis by the best available means.

## PRESCRIPTION FOR EAR CANKER

The following prescription for ear canker in dogs and cats has been used by one of America's leading small animal practitioners for many years.

| | |
|---|---|
| Tannic Acid | 5% |
| Boric Acid | 5% |
| Phenol | 2% |
| Oil Cassia | 1% |
| Glycerine | 40% |
| Alcohol | 47% |

The formula is an ideal anodyne, antiseptic and astringent and often gives quick, sure results in cases obstinate to other treatment. This formula is supplied under the name of Canker Oil.—*Bio-chemic Review.*

## ANAPLASMOSIS, DESCRIBED IN NEW PUBLICATION

Anaplasmosis, an infectious disease of cattle, is now present in many cattle-raising regions of the United States. Probably it was introduced by carriers from tropical countries. This malady, which resembles and may be confused with tick fever in the tick-quarantine areas, also resembles anthrax, hemorrhagic septicemia, and other less serious disorders. It is fully described in Circular 154-C, just issued by the U. S. Department of Agriculture, Washington, D. C.

# The Life Cycle of the Equine Nose Fly*

BOT FLIES have been known from ancient times. The Greeks and the Romans wrote of a fly that terrified animals, undoubtedly one of the bot flies. Aristotle wrote of bots in the throat of deer, and two veterinarians of ancient Greece described bots found on the anus of the horse. In the Eighteen hundreds, an Englishman gave us our present idea of bot flies and bots.

There are three bot flies common in this country. They belong to the diptera or two winged insects. There are nine species of bot flies in the world, but as stated before, only three occur in this country. Each of these three species have two or more common names. For example, the common bot fly or the nit fly refers to the same insect. It is the one that lays its eggs chiefly on the legs of the horse and mule. Likewise, the chin fly and the throat fly are the same insects. As the names imply, this is the bot fly that lays its eggs under the jaw and on the throat of its victims. The nose fly and the lip fly are two common names applying to the other species. This insect lays its eggs on the fine hairs around the lips.

All bot flies go through a complete metamorphosis, that is through four stages, starting with the egg stage, the egg hatches to produce the larvae which grows to full size in the intestinal canal of the horse and goes into a resting stage (pupa), which is passed in the ground. From the pupa stage emerges the adult fly which in turn produces the eggs and starts the cycle over again. The insects do not feed in the adult stage and the fly can neither bite nor sting. We are sometimes asked why then do they terrify animals so. Probably this is partly due to a tickling sensation caused as the eggs are deposited and possibly it is instinctive—an inherent fear.

The three species of bot flies are rather easily distinguished both in the adult, the larval and the egg stages.

In the adult fly the common bot or nit fly, has a dark area in each wing sometimes spoken of as the clouded wing. The nose or lip fly has an orange tail and the chin or throat fly has a dark band, a strip of black across the abdomen.

The larvae can be distinguished as follows: The common bot fly larvae is the largest of the three, and the spines occur in double rows, as they do also in the nose fly bot. The spines of the chin fly bot occur in single rows on each segment of the abdomen. The double row of spines on the nit fly bot occur on all segments or rings of the abdomen. The last ring of the abdomen of the nose fly bot has no spines on it.

The eggs of the common bot fly are yellowish white and attached by a flange to the hairs for two-thirds of the length of the egg. The eggs of the throat fly are the same color as the eggs of the nit fly, but are attached to the hairs of the throat the full length of the egg. The egg of the nose fly is very dark or black, and has a tail like appendage that bends around the hair. These eggs are laid in the fine hairs about the lips and in the nose as the name implies. The tail like appendage often extends into the hair follicle.

The eggs of the common bot fly require friction and moisture to hatch. The egg of the nose fly does not require friction to hatch, but does require moisture. It is not known just how the larvae of the latter get into the mouth. Some have thought they penetrate the skin. Others think they crawl over the lip and into the mouth. It has been said that eggs deposited within one inch of the margin of the lips will hatch in five or six days and deposited within two inches of the margin of the lips, will hatch in 18 days. Eggs of the nose fly deposited more than two inches from the mouth do not hatch at all.

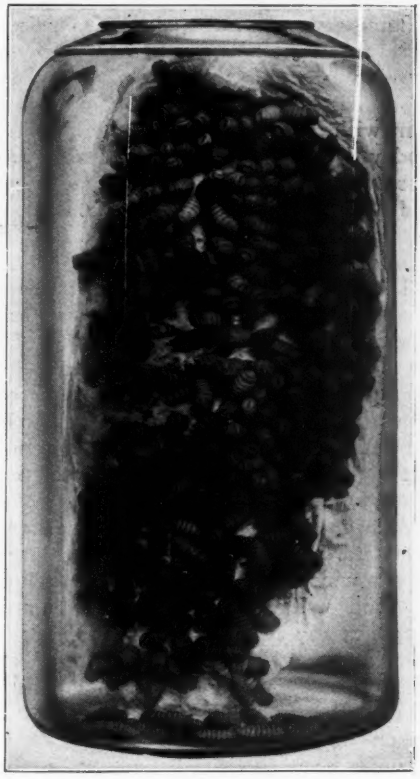
*Notes from an address by W. P. Hayes, Associate Professor of Entomology, University of Illinois, at the Twelfth Annual Illinois Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

The nose fly was introduced into this country recently. In 1926 its known distribution was from Montana to Minnesota and south to Nebraska. It has spread rapidly since that time and now occurs over a wide area. The insect is not a strong flyer and its spread occurs almost entirely by the movement of animals containing the bot in the larval stage of development. All three of the bot flies occur in Illinois and all three are common at least in the northern section of the state.

The *Gastrophilus intestinalis,* the larvae of the nit or common bot fly is the bot that occurs chiefly in the left sac of the stomach. The *Gastrophilus hemorrhoidalis* is the larval stage of the nose fly. They feed chiefly in the duodenum, but on their passage to the exterior, attach themselves to the walls of the rectum for 20 to 72 hours. The common bot fly flies slowly. It tends to hover about the knees and lays three or four eggs at a time, usually on one hair. It lays a total of about 800 eggs. The chin fly lays its eggs in a similar manner on the under surface of the jaws and over the throat. The nose fly flies rapidly. It deposits one egg at a time.

The larval stage of all bots last from eight to twelve months. It is quite common at certain seasons to find two stages of bots in the same animal, a nearly mature set about ready to leave and a younger set. The nose fly bot, *Gastrophilus hemorrhoidalis,* is the first to leave the animal; in this latitude beginning to come out in May. The fly generally disappears by the first of August, about which time the other two bot flies are becoming numerous. They extend on to cold weather and late in the season the eggs hatch slowly, so that bot infestation may occur up until December and even after the first of January. This is important in the treatment of animals. If they are treated before the first of the year, and the eggs are not removed from the body at the same time, reinfestation is likely to occur.

The amount of injury caused by bots is not definitely known. Until recent years it has been generally thought that they did no harm, but observation has shown that animals thrive better without bots and are probably less susceptible to digestive derangements. There can scarcely be any question that the host is more or less injured by the irritation resulting from the spines on the larvae and from their attachment to the gastric and intestinal walls. It is quite possible that the secretions of the larvae also are injurious to the animals.



**Section of a horse's stomach showing gastrophilus larvae in situ.**

At present we can only say that bots cause general unthriftiness in animals. We need more information on the subject. We are by no means justified in saying that they do no harm other than cause unthriftiness. They sometimes occur in enormous numbers. More than 1,000 have been removed from a two-year-old colt.

# The Fox Farming Industry

By E. E. SWEEBE, North Chicago, Illinois

THE veterinary profession should give considerable attention to the fox farming industry of today.

Fox farming has passed through the experimental stage, and is now a sound business industry.

Some few years ago enormous prices were paid for silver fox breeders, which were ranched for the purchaser for an additional sum of from $200 to $300 per pair with the promise of large profits. Today those interested in fox raising are those who purchase several pairs of foxes and have started their own ranches not for the purpose of getting rich quick, but as a legitimate enterprise.

The average price paid for fox breeders of today is from $500 to $800 per pair. The average puppy crop raised to maturity is three pups per pair. Firguring the average pelt price at $100, each pair of foxes will earn a gross income of $300 per year, which is not an enormous profit, but is probably better than earned by other types of live stock.

A large percentage of fox farms have been started and inspired by the large profits which were pictured in the industry and without knowledge of animal breeding or care. Experience has always been an expensive teacher and this has been especially true in fox farming. There is no other industry in the world, in which men have invested so large amounts with so little knowledge of the requirements; but in spite of this fact, the industry has developed in the last ten years to a total of over $150,000,000.

All fox and fur farmers are now aware of the fact that they must understand breeding, sanitation, prevention and disease control and proper feeding rations to be successful in this line.

Many veterinarians are entirely lost when called to diagnose and suggest control measures for outbreaks of fox diseases. There is no reason for this uncertainty as the diseases affecting foxes are no different from those affecting the dog. The only difference may be that the fox has more recently been subject to confinement of domestication and therefore has a lower resistance and is more susceptible to certain diseases.

## Diet

A balanced diet for foxes should consist of meat, vegetables, fruits, and minerals along with an adequate supply of vitamins A, B, C, D, and E.

The meat should be fresh, wholesome, muscle tissue of horse or beef, and should constitute from 50% to 75% of the diet, depending upon the time of year. About 10% ground bone will supply sufficient minerals, and carrots or tomatoes are probably the best source of vegetables. For a filler or roughage, thoroughly dried pulverized bread or shredded wheat biscuits may be added.

## Source of Vitamins

Cod liver oil is the richest source of vitamins A and D and should be fed at all times to promote growth, prevent infection, develop bone, and prevent and cure rickets.

Vitamins $B_1$ and $B_2$ are important to aid digestion, improve breeding, develop pelt and prevent nervous disorders. Vitamins $B_1$ and $B_2$ may be supplied by feeding malt syrup, defatted wheat germ, brewers yeasts, or a commercial product called A-B-D Malt.

Vitamin C is supplied especially by the feeding of horse meat or by feeding any meat of a herbivorous animal. Vitamin C is stored in the muscles of these animals and is liberated when eaten by the fox. Vitamin C is necessary for normal growth and development, and aids digestion.

Vitamin E stimulates and controls normal reproduction; it is necessary to promote large litters, prevent absorption

of fetus in uterus, and aid development of prime pelts. Probably the richest source of vitamin E is wheat germ oil.

### Parasites

More foxes are lost each year from parasitic infestation than from any other condition. The ear mite, lung worm, hook worm and round worm are the offenders.

The ear mite is easy to control and eradicate, but the intestinal and lung parasite cause most serious damage and are difficult to overcome.

Prevention is, of course, the first aim. All male and female foxes should be wormed with an effective vermifuge about mating season and quarters cleaned thoroughly to reduce the infestation to a minimum. Tetrachlorethylene has proved to be most efficacious for both hook and round worm infestations. The dose is a 3-minim capsule for fox puppy and 16-minim for the adult fox. The pup should be treated when three to four weeks old and treatment repeated at six to eight week intervals. Always enforce sanitary measures of removing litter and droppings, disinfecting thoroughly to kill the parasite ova, which is responsible for reinfestation.

Lungworm infestation is the most destructive and most difficult to control of all parasitic infestation. There is no medicinal treatment of value known. Control measures are important; all affected animals should be isolated and placed on tight floor. By following this procedure the pens may be washed and disinfected daily, thereby reducing the possibility of reinfestation. Feed carefully and nurse the animals to maintain a high resistance.

It has been proved that foxes do not die so often from the parasite lung infections as from secondary bacterial invaders which cause complication of pneumonia, etc. Therefore by administering an antogenous bacterin the resistance against these secondary infections may be raised and the animal, if properly nourished, will withstand and overcome the lung parasite infestation.

My personal opinion is that parasitic infestations and improper diet are the contributing factors responsible for 90% of loses of silver foxes.

### Infectious Diseases

Infectious diseases affecting silver foxes are no different than those commonly dealt with in canine practice.

The veterinarian of today must prepare himself to care for and suggest sanitary control measures, proper balanced diets, and diagnose parasitic infestations in fur bearing animals, just as he has for other domesticated animals. There is money spent toward this end and it rightfully belongs to the veterinary profession.

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## CODE OF ETHICS FOR B. A. I. VETERINARIANS

At the annual meeting of the National Association of Bureau of Animal Industry Veterinarians in Chicago last December, a code of ethics was adopted for the guidance of the members of that organization, which includes a large majority of the B. A. I. veterinarians.

Parts of this code of general interest to veterinarians, are:

1. Adverse discussion of the work of another member should be at all times impersonal. Any disagreement should not be expressed in a manner likely to reflect upon a member's competence or intelligence. Members of this association are expected to conduct themselves at all times as professional gentlemen.

2. An official or superior should not take advantage of his position in connection with any official action or decision in the work performed by his subordinates, assistants or associates, even if they are working under his immediate supervision. Conversely, subordinates, assistants, associates and others should respect their obligations to their official superior and colleagues.

3. When officially directed to consult with or cooperate with, or when called into professional consultation by, practicing veterinarians, physicians, zoologists or other scientific and professional workers, an active member of this association should govern himself by the code of ethics adopted and published by the respective scientific and professional organization of which the consultants may be members.

# Bang's Disease Control in Wisconsin*

THE present project for the control of Bang's disease in Wisconsin was inaugurated officially in 1928. For 16 years previous to that time, we had carried on educational work and had done a great deal of testing. This gave us sort of a background on which to start our official plan in 1928.

The basis of our plan is sanitation. It has a two fold purpose, (1) the control of infection and (2) the establishment of clean herds from which shipments may be made both for replacements in our own state and for export to other states, for be it remembered that Wisconsin ships to other states 60,000 to 80,000 dairy cattle a year. We are now in a position to tell buyers just where to go to obtain tested animals and in the main, any buyer may have his animals tested and a certificate made out for their shipment within 24 hours after deciding upon them. Buyers appreciate this service very much. Formerly, they had to wait about a week to get together a herd of abortion free cattle and to get the necessary papers to ship them.

No medicinal product, chemical or biological has been found that will either prevent or cure Bang's disease in animals and therefore reliance must be placed on the complete absence of the Bang bacillus. Our plan calls for the cooperation of three parties, the owner, the county agent and the veterinarian; and while the owner gets the most benefit from the plan, the veterinarian is the most important one in bringing it about.

### The Practitioner's Responsibility

The veterinarian is responsible for: (1) The herd history; (2) identification of the animals; (3) drawing the blood and making the agglutination test; (4) making out the records of the herd; (5) outlining a program for handling that specific herd.

The plan has not the slightest chance to succeed without the fullest cooperation of the practicing veterinarian.

*Notes from an address by F. B. Hadley, Professor of Veterinary Science, University of Wisconsin, Madison, at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

### The Farm Adviser Necessary

The county agent is of great importance in this plan. He gets it before the breeders usually in groups, arranging for a meeting by telephone or by letters. He gets speakers for these groups from the Department of Agriculture and the University. He can do it much better than can the local veterinarian. If the local veterinarian worked up this matter, since he would be doing the work, it might be thought that he was doing it for personal reasons. By keeping out of the active preparation and going on the program after the meeting is called by the county agent, he is in a much better position than otherwise.

In counties where there is no county agent, no effort has been made to start the work. We have had no invasion of the work of the veterinarian by the county agent or *vice versa* in our state, and no complaints from either veterinarians or the county agents.

### Tests Are Best Where Made by the Practitioner

The Wisconsin control plan is established on the blood test. On the results of this test, the plan for the control of the herd is built. We regard the slow tube test and the rapid plate method as being equally accurate, but the tube test requires 24 hours, necessitates considerable laboratory equipment and technical skill. The rapid plate method requires but five minutes, it can be applied with simple equipment by any up to date veterinarian. *Experience has shown that the chances of error are less with veterinarians making the plate test themselves than it is with the tube test done in our laboratory.*

The College of Agriculture staged a series of demonstrations of the plate method of making the agglutination test. These demonstrations were attended altogether by more than 250 veterinarians who voluntarily came at different times. They soon developed speed, skill and ability in making the test, and were shown how to read the results of the blood test into the herd history for only

then can the plan for the control of the herd be formulated.

Their work and their plans have been as good as the Department of Agriculture can outline and an official certificate issued as a result of the test made by a practicing veterinarian means just as much as if the test were made by any one else. A permit to do this testing may, of course, be revoked for carelessness and incompetence. Check tests are run at frequent intervals and the work otherwise supervised, as official work of this sort should be.

### A Proper Antigen Absolutely Essential

The problem of a satisfactory antigen was a difficult one to solve, but it has been worked out with the complete cooperation of a number of commercial laboratories who supply a uniform antigen approved by the Department of Agriculture. All of our animals have been tuberculin tested, and identification is usually by means of the TB tag number. It has been fairly satisfactory and avoids the use of a special tag.

The speaker was asked if positive reactors to the agglutination test for Bang's disease ever recover. In reply, he cited the experience of the experimental herd at the University, stating that it wasn't an average herd and one would not find the conditions there in the average herd. In the first place, it is a hermit herd, that is, it has no contact with other animals, and no new animals are added to it. In the second place, it is better cared for and sanitary conditions are better than in the ordinary herd.

### Most Reactors Become Negative

In the herd in question, 50% of the reactors following the first exposure became negative in 90 days and remained negative thereafter unless they were later infected. Of those that reacted on the first test and became negative within 90 days, not one has aborted. And only 13% of those that reacted soon after the first exposure have remained positive over a period of four years.

The lesson from this is that the farmer who has his animals tested during a "storm" of infection need not dispose of all reactors at once. Many of them will become nonreactors within 90 days and remain so and they constitute no hazard to good breeders. However, nothing justifies keeping positive and negative reactors together for any considerable length of time; but if a man is unable to dispose of his reactors, he can make considerable progress by dividing his herd into two groups and keeping them in one stable, separated even by a temporary partition six or eight feet high.

Animals that remain positive over a period of several months are usually permanently infected carriers and constitute a permanent hazard to susceptible animals. Nearly all reactors in low dilutions following the first exposure recover. Only five of the reactors in the University herd developed udder infection. All five gave milk that reacted to the agglutination test and infected guinea pigs.

### Fees for the Work Differ

No attempt has been made by the University or the State Department of Agriculture to say what fees a veterinarian shall charge for this work and different veterinarians charge different fees. Where the animals are tested in groups, the cost is less, and where county agents have arranged it so that 100 or more blood samples can be collected in a community in a few hours, the veterinarian can do it for a small fee and this has appealed greatly to the farmer, especially this season when dairy products are cheap.

The veterinarian isn't taking a loss to do this work at a low fee because the blood test is only the beginning of the work. The plan of control has been but barely initiated when the blood test is made. In groups, a testing usually costs 35c to 50c a sample and the veterinarian should take pains to see that the farmer knows fully what he, the veterinarian, is doing for the 35c or 50c fee. For one thing, the fee includes mileage; it includes tubes; the time required to collect the blood sample; the time required to make the test at the office; it includes making a report of the test to the State Department of Agriculture, to the farmer and a copy for the veterinarian's files; it includes the time required to analyze the data and formulate a plan.

### The Most Satisfactory Project Ever Supported

In 25 years, I have never gotten so much satisfaction out of any work that I have done, as I have out of seeing this Bang's disease control project instituted and taken hold of by the practicing veterinarian. It is the best thing that has ever happened for them. It gives them more prestige with the farmers and they are better appreciated in their communities. What is perhaps even more important, it has made them better men, more scientific in their practices and has given them a better opinion of themselves. It gets a man out of the rut that routine practice tends to put him in.

### Specific, Near at Hand Counsel Indispensable

After the veterinarian has reported the results of the test to the owner, reported it to the State Department of Agriculture and filed a report in his records, his work has only just begun. Next, he must study the history of the herd. It is better if he sits down with the owner and they study this together. They will get more out of it that way than either one alone can get out of it. The practitioner then formulates the plan for handling the herd, explains the time for and necessity of retests, and what to do. An error in judgment by the veterinarian at this time is serious. It loses the confidence of the owner. The more explicit and the plainer he makes his directions to the owner the better it is. The owner should be given a copy in writing, of just what he is to do, and the importance of each detail must be impressed upon him. The veterinarian should take lots of time at this stage of the work.

A state control laboratory has been established, but they cannot charge for making tests nor will they make a test for a herd owner more than once. No test in our state is official unless a veterinarian has drawn the blood sample and as explained before, the great majority of our official tests are made by the local veterinarians themselves. The plan is soon to have *all official tests* made by the practicing veterinarians.

### This Work Will Go to the Practitioner Who Can Do It

We are in a better position in Wisconsin as to the control of Bang's disease than ever before. I predict that veterinarians in neighboring states will be called upon to do this work soon. The demand for it is increasing. Fair officials will soon require that all animals exhibited must be free from the disease as shown by the test. Interstate shipment will probably soon be limited entirely to animals that have given negative reaction. There are so many advantages to having the practitioner do this work that it will doubtless all come to him soon *if he is prepared to do it.*

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## FLORIDA PUSHES TICK ERADICATION

Nine counties in the central part of Florida are engaged in a tick clean up campaign. It is expected that they will be added to the list of tick free counties by the end of the season.

On December 1st last, 30 of the 61 counties in the state had been released from tick quarantine.

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## VETERINARY SERVICE*

The veterinarians of this state face a new opportunity for service of immense value to their communities. I refer to the need for control and eradication of Bang's disease in cattle.

If we throw aside this opportunity as we did with hog cholera control, of course, we will make another big mistake. We shall lose the opportunity to handle abortion control work only if we are incompetent or overcharge. The farmers are not all fools and they can't be fooled for long. We found that out in the matter of hog cholera vaccination, for which it must be said, some overcharged and then nearly all of us lost the work.

There is a field for our service in the control of Bang's disease. Whether or not the work comes to us and remains with us, depends upon us alone.

*Notes from an address by A. M. Pottinger, Peru, Ill., at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

# Results of Blood Testing For Abortion Disease*

By CHAS. H. KITSELMAN, Manhattan, Kansas
Department of Pathology, Division of Veterinary Medicine,
Kansas State Agricultural College

IT WAS found that the agglutination test was about as accurate as the complement fixation test to detect abortion disease as early as 1920 in the work done on the college dairy herd at Manhattan.

This was, of course, the long or tube test and it was not until 1927 that the rapid or plate test received the attention of the veterinary profession. It is now generally conceded that the rapid test is just as reliable and infinitely quicker and less complicated than the long method.

Before going into the results of our work, I want to call your attention to the disadvantages of the rapid test, because there are some distinct disadvantages to it.

The most important has to do with the antigen. Our work, not yet published, definitely shows that as the antigen ages the sensitivity decreases or in other words, as the antigen ages the test misses more infected animals.

The most sensitive antigen found by us was prepared after Huddleson's method and used not longer than thirty days after its preparation. Another factor involved is the age of the bacterial growth before it is washed off for standardization. It was found also that the proper pH or titration of the prepared antigen ranges from pH 6.8 to 7.2 or right at the neutral point.

We have a number of times found a blood sample to be negative on an old antigen, whereas on an antigen under a month of age the reaction was at least 1-100 positive.

An antigen diluted with 12% NaCl while it is faster in action does not hold up as long as the physiological NaCl diluted one and so at this time I am using the latter type of antigen.

So much for antigens, the next thing which I wish to take up is the procedure of blood testing for this disease.

It is useless to blood test animals immediately after vaccination, because there always will be anti-body production and consequently a positive agglutination reaction.

The duration of the reaction varies with the kind of the material injected. For instance, following the bacterin injection, the agglutination test will be positive for at least three months in a cow which was negative before the injection. If the live germ is injected the test will remain positive for at least double this period and in some cases for years.

In an experiment running at the present time, two cows, both blood reactors, were given three injections of live germs intravenously at weekly intervals and their blood response was a positive reaction of 1-20,000 and 1-10,000 respectively. These reactions have persisted for the past five months or to date.

How long does a calf remain a blood reactor?

In our isolated herd (blood reactors) at Manhattan, 12 calves were removed after sucking positive dams for three days and were placed on negative ground for periods ranging from four to eight weeks and, of course, were fed milk from blood negative cows during this period. In no case did a calf fail to become negative during the eight weeks period, nor did one again become positive after leaving the neutral ground to enter the main calf barn. I have records of repeated tests on such calves for over two years and all of these animals are holding up as clean animals.

Also in 25 cows isolated in 1927, all of them were blood positive in 1928, 18 in 1929 (seven sold as non breeders and be-

* Read at the annual meeting of the Kansas Veterinary Medical Association, Topeka, Jan. 21, 1931.

cause of mastitis), 10 (eight sold) in 1930 and all of these are still blood positive.

An outstanding fact is that the bull used in this herd and kept more or less in direct contact still remains negative to the blood test.

We have at present about 60 herds of cattle following the Kansas Control Plan, most of these are under the personal supervision of the practicing veterinarian in their locality.

At least ten of these herds have remained clean for over one year and three herds for almost two years. Some of the others are clean on the last test, while several showed at least one new reactor on the last test.

How many tests are required to clean up a given herd? I will give figures on three representative herds.

I. Purebred Guernseys

October 20, 1929—Number tested, 35; number positive, 8. Procedure—isolation of reactors.

December 1, 1929—Retest. Number tested, 35; number positive, 9. One new reactor—all isolated.

March 11, 1930—Number tested, 34; number positive, 8. Sold one reactor—no new reactors.

July 5, 1930—Still maintaining two herds—no change.

December 3, 1930—Still maintaining two herds—no change.

II. Purebred Ayrshires

January 28, 1928—Number tested, 61; number positive, 19. Procedure—Sold 5, isolated 11 head.

February 28, 1928—Number tested, 46; number positive, 14, isolated; number negative, 32. Sold ten head.

June 2, 1928—Number tested, 31; number positive, none. Sold 9 head. Six in isolation.

December 28, 1928—(Same).

February 25, 1930—Number tested, 48; number positive, none. All positive cows sold during this interval.

Due next month for annual test.

III. Purebred and grade Herefords

January 3, 1930—Number tested, 49; number positive, 4. Sold two head. Isolated two.

February 11, 1930—Number tested, 42; number new positive, 3. Three calves not tested, two isolated cows not tested, two sold. Total, 7. Isolated new reactors.

March 22, 1930—Number tested, 37; number new positive, 1; number new suspicious, 1. Isolated new reactor.

November 24, 1930—Number tested, 48 (all ages); number new positive 5 (three calves from positive dams); number old positive, 13 in isolation.

This owner would not isolate a cow at calving time and allowed cows showing a discharge to run in the clean herd.

My experience has been that every discharging cow should be isolated whether a blood reactor or not, also a cow can be negative at calving time or at time of abortion, but will become positive during the next six to eight weeks and if so, can do considerable damage in spreading the infection during this interval.

## VESICULAR STOMATITIS

Although vesicular stomatitis, a disease of horses, mules, and cattle, is of rare occurrence in the United States, there have been three outbreaks in recent years—in the East and Middle West in 1925 and in the South in 1929. The similarity of the early symptoms of the malady to those of the dreaded foot-and-mouth disease has given livestock owners and veterinarians cause for alarm. A full description of the disease and its history is presented in Department Bulletin 662-D, Vesicular Stomatitis of Horses and Cattle, just issued in revised form by the U. S. Department of Agriculture.

## AN UNUSUAL OUTBREAK OF AVIAN PASTEURELLOSIS*

Hemorrhagic septicemia and fowl cholera are the same. Two types of the disease are commonly found, one, acute form where no trouble may be noted in the flock at night and in the morning several birds may be found dead under the roost. The more chronic form is well known. In this the fowl have a diarrhea, sit humped up and die in two or three days to a week. A localized form of hemorrhagic septicemia or fowl cholera is also seen, sometimes accompanied by edema of the wattles, sometimes associated with roup, sometimes associated with high protein stimulation and rupture of the oviduct. Some attacks of paralysis in fowls in which no lesions are found are likewise due to hemorrhagic septicemia. In such attacks, some of the animals will be lame.

*Notes from an address by Frank Thorp, Jr., Assistant in Animal Pathology, University of Illinois, Urbana, at the Twelfth Annual Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

# A Practitioner's View of Contagious Abortion of Cattle*

By S. L. STEWART, Olathe, Kansas.

CONTAGIOUS abortion, it has been estimated authoritatively, costs the live stock industry of the United States $175,000,000 annually in decreased production of milk and calves and in loss of cows. The loss due to restrictions on sale of animals cannot be estimated with any degree of accuracy.

In my judgment contagious abortion will be controlled eventually, but I doubt if it will ever be eradicated.

Contagious abortion is essentially a disease of the pregnant cow. A calf if it becomes a reactor, may continue as such for a few months, but will eventually become negative and stay negative; there is no loss occasioned by the disease in calves. It is only in the pregnant animal that loss occurs. Infectious abortion must be treated as a disease of pregnancy or of the lactation period.

Practicing veterinarians are constantly coming in contact with the problem of abortion disease control. The cost of abortion in infected herds is frequently tremendously large and in certain cases it means financial ruin to the owner of the herd if the disease is not controlled. In such cases it becomes the veterinarian's duty to prevent loss so far as possible under existing conditions or conditions that it is practical to bring about. Fine theories as to what should be done have no practical value unless they are applicable right there where the affected herd and afflicted owner are. It is the professional duty and it is a moral duty of the veterinarian to save his client's business, and his herd and to keep him out of bankruptcy if he can.

The owner of an infected herd will consult with a veterinarian in whom he has confidence and be guided by his advice, unless he has been sidetracked by some one who did not know or had something to sell. The owner of cows affected with contagious abortion seeks information where he can find it, right or wrong. Sometimes the advice he gets is wrong, and sometimes he is hoodwinked. Wrong counsel often costs him a staggering sum before he becomes convinced that he is misled and can be switched to the right line of treatment.

The proper handling of contagious abortion in a herd is no easy problem even for the most competent, because of other diseases that may be, or may become, complications, and because of variable surrounding conditions, differences in herds, care, feed, etc. You can not give directions for this task in an offhand manner, or on a printed sheet. It is a job for the man on the ground and it will require his best efforts not for a single visit or for two visits, but over a protracted period during which new conditions requiring his best judgment will arise again and again.

Contagious abortion has reached the point where the problem of control is so important that it attracts the attention of everyone, directly or indirectly. It concerns especially the live stock producers, health officers, sanitarians and scientists everywhere. Farm and dairy papers are publishing numerous articles written on contagious abortion. The editorials of such papers are commenting on this malady and especially upon its control. They are emphasizing the fact that there is a wide difference of opinion, or contention, in the veterinary profession pertaining to methods in diagnosing, in treating and in control work. Some editorials comment unfavorably upon the veterinary profession because of this difference of opinion.

The following is from an editorial in Hoard's Dairyman, March 10, 1930: "We are not sure that testing herds and elimi-

*Read at the annual meeting of the Kansas Veterinary Medical Association, Topeka, January 21, 1931.

nating reactors will ultimately get rid of the contagion. The antigen is not standardized; the methods used by laboratories in testing the sample of blood do not give the same results—their methods differ." Such statements indicate a lack of confidence in the veterinary profession on the part of the dairy and farm paper editors. This has caused a lack of confidence of some of the breeders of live stock. This lack of confidence expressed in some editorials is at least in part due to the various opinions of laboratory workers, both private and public, agricultural experiment stations, investigators, sanitarians and other scientists. These men have their own ideas regarding contagious abortion, its control and eradication and usually will not concede anything, even for the sake of harmony or the formulation of a plan by which a uniform method may be adopted that will gain the confidence of the public—especially the live stock producers—in abortion disease control.

There is no disease of cattle more vital to the wefare of the live stock industry and to the veterinary profession than abortion disease and yet we talk and dilly-dally, and after 25 years of experimental work we have arrived at the open door of criticism that is coming from many sources, because of the garding contagious abortion and its control. contentions in the veterinary profession re-

In my judgment recent action taken by the American Veterinary Medical Association and the Live Stock Sanitary Association, discountenancing the use of live vaccine in the treatment and prevention of this disease will materially retard progress in the control of this disease.

Reports of splendid results from the use of live culture vaccine and bacterins have come from many sources, England, Germany, East Africa, United States and elsewhere.

Many practicing veterinarians have used the live culture vaccine with satisfactory results. Some veterinarians use vaccine or bacterin along with the isolation method, some require mineral supplement fed in addition to vaccination. Others use both bacterin and vaccine, as deemed best. But the fact still remains that veterinarians report good results from the use of live culture vaccine.

W. A. Axby, a practitioner at Harrison, Ohio, put it well recently when he said: "Vaccination is the only available means for the control of abortion disease. Vaccine is administered to all non-pregnant cows and heifers in known infected herds. This method has proved its real merit and in my experience has given universally satisfactory results."

In my judgment it would be just as feasible to stop a main line railroad from operating fast passenger trains because a fast train was derailed and 14 people killed, or to prevent the use of automobiles because accidents happen and people are killed by them, as it is for the American Veterinary Medical Association and the U. S. Live Stock Sanitary Association to recommend the discontinuance of the use of contagious abortion live culture vaccine, because some cows abort after vaccination or because a few cows still are carriers of the disease, or because of the possibility of about one person in every 90,000 contracting undulant fever.

I believe that contagious abortion will be controlled only when the Agricultural Department of the Federal Government and of the states lend their influence toward proper *publicity* and when *they cooperate* with the practicing veterinarians of the entire country, as it is only through the practicing veterinarians that abortion will ever be controlled.

It is doubtful whether the percentage of undulant fever cases would be increased during the period of a country-wide control by vaccinating since the percentages of young cows and heifers that react to the agglutination test at the end of three months after vaccination is small. Few if any become carriers, and probably none are capable of transmitting the disease to man.

According to published reports, the California Experiment Station has demonstrated only one instance where a carrier was produced by the use of live culture abortion vaccine. Drs. Boyd and Fitch have not been able to show that the use of live culture vaccine actually produces carriers. The Cali-

fornia station did not report the viability of the organisms eliminated from the cow as a result of injection of live cuture vaccines. In other words, it is not known at the present time whether man is susceptible to that infection or not. It is reasonable to assume that organisms eliminated from cows treated with live culture vaccine would not be as virulent as organisms from the disease itself.

As a matter of fact, it is now being rather clearly shown that much of the human infection is the result of infection by the swine strain of the organisms, rather than the cattle strain. It is evident that if a man were very susceptible to bovine strains of abortion organisms the majority of people would be affected.

Since it has not been proved that vaccinating dairy cows with live culture vaccine is in any way detrimental to other cattle or to the human race, let us not try to impose a further great financial loss upon the already overburdened farmers and dairymen by preventing or even discouraging the use of agents that will build up resistance against abortion.

My experience with live culture vaccine has been satisfactory. It has not been 100 per cent effective except in a few cases. Satisfactory results were obtained in all the herds treated except two. In these two herds disaster followed vaccination. Records of these two herds could not be made correctly for several reasons, but I do not blame live culture vaccine for the disaster. In one of these two herds granular vaginitis was present, and it later developed that nutritional deficiency existed in the herd. No doubt these conditions were in part responsible for the results that followed vaccination. Accurate diagnosis of no other disease present seems to be as important as it is in the case of abortion.

We know that in some cases a lack of vitamins, either B, D or E will cause abortion and frequently a deficiency follows the disease of abortion, and we well know the influence of feed. Granular vaginitis will prevent conception and frequently causes abortion. While it is not usually classed as an abortion producing disease and rarely ever terminates fatally, it does seem to cause many abortions in infected herds, especially when associated with contagious abortion. I now believe the agglutination test led me astray in diagnosis in this herd (Herd No. 2) and the disaster that followed vaccination was not caused by the vaccine or by the Bang organism.

E. K. Glover reports a herd of 30 cows that gave 19 reactors to the agglutination test. Every cow that had aborted had a granular vaginitis. The infection was brought on the place by a new bull. All aborting cows had been bred to this bull and aborted showing a streptococcic infection. The granular vaginitis was treated and recovery followed.

The table gives the results obtained in 12 herds treated in 1929 in which abortion was rampant. The records for herds treated in 1930 are not yet complete.

All pregnant cows received 20cc bacterin, after calving they were vaccinated with a live culture vaccine 30 to 60 days prior to breeding.

REPORT ON 12 HERDS TREATED FOR ABORTION IN 1929

| Herd No. | No. of Cows in Herd | No. of Abortions | No. of Cows Tested | No. of Positive Reactors | No. Vaccinated | Abortions after Vaccination | Percentage Calf Crop | No. Revaccinated | Abortion after Revaccination |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 16 | 15 | 2 | 2 | 7 | 0 | 100 | ..... | ..... |
| 2 | 18 | 5 | 5 | 3 | 18 | 9 | 50 | ..... | ..... |
| 3 | 10 | 3 | 3 | 3 | 10 | 0 | 100 | ..... | ..... |
| 4 | 15 | 2 | 2 | 2 | 15 | 0 | 100 | ..... | ..... |
| 5 | 11 | 10 | 1 | 1 | 11 | 4 | 64 | 4 | 0 |
| 6 | 26 | 13 | 0 | 0 | 26 | 2 | 92 | 2 | 0 |
| 7 | 18 | 8 | 7 | 7 | 18 | 2 | 89 | 2 | 0 |
| 8 | 24 | 3 | 3 | 0 | 0 | ..... | 100 | ..... | ..... |
| 9 | 16 | 5 | 5 | 5 | 16 | 0 | 100 | ..... | ..... |
| 10 | 18 | 4 | 4 | 0 | 0 | 0 | 100 | ..... | ..... |
| 11 | 40 | 5 | 1 | 1 | 1 | 0 | 100 | ..... | 0 |
| 12 | 35 | 7 | 2 | 2 | 2 | 0 | 100 | ..... | 0 |

## Discussion

Nine of the cows in Herd No. 1 were deemed unprofitable and sold for slaughter. The seven that were vaccinated included six that had aborted since producing a living calf.

In Herd No. 2, I think the agglutination test misled me, and that there was no infectious abortion present. This is the herd referred to above where granular vaginitis and nutritional deficiency were present. The herd was sold.

In Herds No. 5, 6 and 7, in which abor-

tions occurred after vaccination, the animals were revaccinated and bred. None of these animals have aborted after revaccination, so that as a result of vaccination or a single revaccination and treatment of a few cows for sterility, I have received a 100 per cent calf crop in all instances, where the trouble was due to infectious abortion. That is, assuming that a mistaken diagnosis was made in the case of Herd No. 2.

The trouble in Herds No. 8 and 10 was diagnosed as nutritional abortion and the herds were placed on a mineral supplement (Vitamineral) for 60 days. There have been no abortions since, a period of 14 months and 15 months respectively, in these herds.

It should be remembered that sterility and mammitis are common in herds in which abortion is prevalent. Such cases must be treated as those diseases develop. Cows that develop sterility must be treated in order to again bring the calf crop to normal. Frequently, because of sterility, some cows will not conceive for several months following abortion. For this reason the time may be lengthened before the herd will produce a normal calf crop.

In conclusion, I want to emphasize my belief that with proper cooperation and proper vaccination, contagious abortion can be controlled; that, from a careful study of results of experimental work I seriously question whether vaccinated healthy cows will spread abortion to other cattle or transmit undulant fever to man; that other diseases than contagious abortion will cause cows to abort; that a herd may have cows that react positively and no abortions; that in such herds, abortions may be due to other causes than *B. abortus;* that an accurate diagnosis is necessary, not only of contagious abortion, but of other diseases that may cause abortion.

At the present time, in infected herds I am vaccinating all cows, open and pregnant, at the same time with live-culture vaccine. I prefer to vaccinate heifers very close to breeding time or, preferably, soon after conception. I doubt if live culture vaccine will give desired results used on heifers as long as 90 days before breeding. In some herds fed wholly on ensilage, an acidosis exists which may be closely associated with abortion in those herds. I am a firm believer in the advantages of feeding a mineral supplement in all aborting herds, to establish, if possible, a greater resistance to disease.

## FIND THAT TWO LUPINES POISON STOCK

In areas in northern California and in eastern Oregon and Washington many cattle have died apparently from plant poisoning. In certain localities where the symptoms of the affected animals have been described as very similar to those of cattle poisoned by larkspur, there were very few of these plants, and in some areas none at all. In 1925, W. W. Eggleston, of the Bureau of Plant Industry, U. S. Department of Agriculture, while making a botanical survey in one of these areas, was informed that a cattle owner suspected that a species of lupine, known botanically as *Lupinus caudatus,* had poisoned his cattle. Another plant identified as *Lupinus laxiflorus* variety silvicola grew abundantly in a neighboring area.

The Experiment Station of the Bureau of Animal Industry at Salina, Utah, procured some nearly mature fruit of this plant and fed it experimentally to cattle, horses, and sheep. While this lupine poisoned all three species of animals, it proved particularly dangerous to cattle. It was slightly less poisonous to horses, and was only about one-tenth as toxic to sheep.

The visible effects of this plant differed considerably in the three classes of animals. In cattle the symptoms were very similar to those of animals poisoned by larkspur. There was marked weakness and muscular trembling. Both symptoms increased greatly if the animals were made to exert themselves in any way. Poisoned horses acted as though affected by a colic, while sheep became very nervous and excitable. The duration of the symptoms varied from about one hour to more than eight days.

# Undulant Fever*

UNDULANT fever is a specific infectious disease caused by one or more members of the bacterial genus Brucella. The most characteristic symptom of the disease is an irregular fever lasting for an average of six months, but extending in some cases over a period of several years. The undulating character of the fever gives the disease its name.

All three varieties of the Brucella organism cause undulant fever. Undulant fever has undoubtedly existed in this country for a considerable period but has been overlooked until Alice Evans' work warned us to look for a febrile reaction in man and not abortion as occurs in cattle.

Undulant fever was first recognized in the United States in 1910. At the end of December, 1924, 128 cases had been reported in the United States, of which 121 were in the Southwest and were probably all due to infection with the melitensis or caprine strain of the organism. In 1925, 24 cases were reported, mostly in Texas. In 1926, 46 cases were reported. In 1927, 217 cases were reported. In 1928, 647 cases were reported and in 1929, 1,305 cases were reported and the disease was known to be present in every state of the Union, in Washington, D. C., and in Hawaii.

Prior to 1929, no seasonal prevalence of the disease was noted. In 1929, it increased in prevalence up until September, during which month 160 cases were reported. The number of cases monthly decreased during the remainder of the year, to 67 in December. In 1930, there were more cases reported and they were more evenly distributed throughout the year, the lowest number, 74, occurring in March and the highest number, 137, in July. It will take years to draw definite conclusions as to whether or not there is a seasonal prevalence.

In children the disease is rare till they reach the age of puberty. This is analogous to the condition found in cattle, where they are relatively unsusceptible to the infection until they reach sexual maturity.

In the whole country the disease is three times as prevalent in males as in females. In urban districts the disease occurs as frequently in one sex as in the other. In rural districts it is eight times as prevalent in man as in woman. Although the disease rarely occurs in persons before sexual maturity, the menopause in women gives no immunity to it.

Veterinarians constantly come in contact with infected animals and are subjected to a greater hazard than others. It is important that they know the symptoms of the disease. The incubation period of the disease is not definitely known. It has occurred in as short a period as five days after accidental conjunctival inoculation, and is believed to have occurred in two British soldiers as a result of exposure in a British Naval Hospital in Malta ten months previously.

Most cases develop after an incubation period of ten to 30 days. The patient is usually unable to set a definite day when the illness began. It is sometimes called indolent fever, and that is a good description of it. Affected persons lack ambition, have a disinclination and an incapacity to work. They may start out in the morning feeling pretty well but by midday are completely tired out. Attacks are sometimes ushered in with severe chills. These come at irregular intervals, they may be several days apart or there may be two or more on one day, thus differing from malaria. Fever is present in all cases of the disease. Frequently, it is higher than one would expect from the other symptoms. Persons suffering from this disease are frequently moving about, may go to town to see their doctor, with a temperature of 104° F.

Undulant fever and brucelliasis should be distinguished. Undulant fever refers to the clinical form of the disease; that is, when there is actual illness. Brucelliasis refers

*Notes from an address by H. E. Hasseltine, Hygienic Laboratories, Washington, D. C., at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

to the presence of the infection as indicated by a positive agglutination blood test.

The temperature in undulant fever is very irregular. There are usually about two peaks per day. Next to fever, the most constant symptom is profuse drenching sweats. These sweats are usually spoken of as occurring at night, but they occur at any time, day or night, if the patient sleeps. Next to drenching sweats, the commonest symptom is an aching all over the body and sometimes localized in the back of the neck.

Headache and pain in the joints occurs in about one-third of the cases. The joints are sometimes swollen and painful to the touch and such cases are frequently wrongly diagnosed as rheumatism. There is a loss of weight in practically all cases. The blood contains fewer than the normal number of leucocytes. There is anorexia in the beginning. Insomnia is a common symptom. Emotional instability is also quite common. Sufferers are apt to be very irritable and have a tendency to causeless weeping.

Complications that occur are orchitis, epididymitis, mastitis and ovarian pain, and occasionally endocarditis. Where the latter complication occurs, the cases may end fatally. The blood gives a cross agglutination with tularemia in 15% to 20% of the cases.

No treatment is known to be of any specific value. One physician has recently reported excellent results from the intravenous injection of methylene violet.

A positive agglutination test without clinical symptoms does not warrant a diagnosis of undulant fever. The blood of one Illinois veterinarian that I examined agglutinated in a dilution of 1:640. Yet he was not ill and there was no history of illness.

The mortality is low. Not more than 2% of the recognized cases of the disease terminate fatally. It is believed that many of the lighter cases recover without recognition.

Miss Evans, who discovered the identity of the *Micrococcus melitensis* and *Br. abortus* suffered from the disease for six years and yet her blood never agglutinated in a dilution of higher than 1:80.

The disease has been confused with tuberculosis and recent examinations at tuberculosis hospitals have shown them to be treating a considerable number of cases of undulant fever. There is no specific remedy. Rest in bed, good nursing, a liberal diet, and treatment of symptoms and complications as they arise constitute approved therapeutic efforts.

Doctor Amoss has reported excellent results from the use of dyes, particularly from the intravenous injection of methylene violet, but all of the cases treated were of six weeks standing or longer, and this suggests that they were about ready to get well anyhow. Mercurochrome and acriflavine have been tried and given good results in some cases, but not always.

The epidemiology of 435 cases in Iowa was studied. 198 cases (103 males and 95 females) were placed in the milk group. These were residents of cities and had little or no contact with live stock. There was no other source of infection than milk that could reasonably be incriminated. Of these 198 cases, 90% used raw milk all of the time and 10% used raw milk part of the time. 193 cases (184 males and 9 females) were placed in the farm group. Contact with live stock was believed to be the source of infection in these cases, although the consumption of raw milk could not be entirely excluded. 44 cases (43 males and 1 female) were placed in the meat group and included workers in packing houses and butchers. All of these cases had a history of contact with pork. Eight used raw milk and two used partly raw milk. The remaining 34 used pasteurized or canned milk. Again, it is not entirely possible to eliminate milk as a source of infection in all of these 44 cases, but the presumption is that they were due to infection from swine products.

In 48 cases in which cultures were isolated and identified, 14 were due to the bovine strain, and 34 to the porcine strain. None in the milk group showed the porcine strain. There are a good many cases on record in which it can be said with almost absolute certainty that the persons were infected by consuming milk contaminated with the organisms.

One woman living in the District of Columbia, drank frequently of the milk of the family cow and in making butter from this cow, kneeded the butter with her hands. The cow had never aborted but her first calf was born dead. She gave a positive agglutination test and abortion organisms were isolated from all four quarters of the udder. The woman contracted the disease. Other sources of infection could be practically eliminated.

Two cases occurred in a single Maryland family that also seemed undoubtedly due to milk borne infection. A daughter in this family worked in Baltimore where she had no contact with animals and did not use raw milk. She came home for the holidays and three weeks after returning to work, came down with the infection. A son, who worked in an industrial plant, boarded at home. He contracted the disease later. His sister drank milk of the family cow while at home during the holidays and he drank it regularly. Neither did the milking nor had any contact with the cow. The cow had a history of having aborted and her blood reacted to the agglutination test in a dilution of 1:5120. *Brucella abortus* organisms were isolated from the milk.

The cases reported at Valdosta, Georgia, also support the milk-borne theory. Eleven cases occurred in a town of 3,500 inhabitants. All used the milk from one dairy, a dairy that furnished 17% of the milk of the city. On examination 42% of the animals in this dairy gave a positive reaction to the agglutination test. It is noteworthy that when the sale of milk from this dairy was stopped, the owner put in a pasteurizer, resumed business and his sales were reduced only 20 quarts per day, showing a low percentage of raw milk cranks. There are many reasons for the pasteurizing of milk. Undulant fever is only one of them.

The logical method of prevention of undulant fever is the eradication of the infection from live stock. This will prevent not only the milk-borne cases but those due to contact with live stock and food products of animal origin.

The eradication of the brucella infection from live stock is a task for the veterinary profession. It appears that the plan based upon the application of the agglutination test and the segregation and ultimate elimination of reactors offers the most promising course to be followed. When I consider the achievements of the veterinary profession in the eradication of bovine tuberculosis, which I believe is a more difficult problem than the eradication of abortion, I have no serious misgivings as to the ability of the veterinary profession to accomplish ultimately the eradication of brucella infection from the live stock of this country.

## NOSE FLY CONTROL IN HORSES*

The systematic treatment of horses for bots was taken up by a number of Farm Bureaus in Illinois soon after the first of the year. The plan went over big where it was given any attention. In a week following a meeting of the Farm Bureau in Logan and DeWitt Counties to consider this matter, 1,200 horses were treated. In McLean county 2,000 horses were treated following a meeting called of the farmers in that community to consider this matter. In Ford County a similar meeting resulted in the treatment of more than 1,000 horses.

The work was supported and arranged for in all cases by the farm adviser. The treatment was administered by veterinarians, practically all the veterinarians in the community participating in the work. The charge made was 50c per head, and no dissatisfaction resulted either on the part of the farmers or the veterinarians because of this charge. In all districts, so far where the work has been undertaken 100% of the horses have been treated.

The anthelmintic used was carbon bisulphide and it was administered in capsules after keeping the horses off feed for about 18 hours. Most veterinarians will break an occasional capsule in the horses mouth when beginning this work. So far no fatalities have resulted from this, but alarming symptoms are sometimes produced. Warm water or saliva was found preferable to oil or vasoline as a lubricant for the capsules.

*Notes from an address by L. H. Morin, Clinton, Ill., at the Twelfth Annual Illinois Veterinary Conference, University of Urbana, Illinois, Feb. 10-12, 1931.

## PIG ANEMIA*

This disease is found only in litters of pigs that are farrowed early. That is, in the late winter or early spring, and kept on floors. It occurs between the second and fifth week of age. It is definitely prevented by the administration of iron and copper sulphate.

The blood of pigs at birth has a high hemoglobin content. This rapidly decreases in a few days. When it reaches a point of 3.5mg of hemoglobin per 100cc of blood, the pigs have a low resistance to disease and fall victims readily to unfavorable conditions.

It is impossible to increase the iron and copper content of milk of either the sow or the cow. Administration to the pigs must be relied upon for prevention and treatment.

Pigs that live until six weeks of age are likely to recover from the anemia spontaneously and at eight weeks of age are as heavy as normal pigs that have not suffered from anemia. The death rate is the highest between the third and fourth week.

Anemia does not occur uniformly in litters of pigs or in different litters. The pigs that develop the fastest suffer soonest from anemia. Pigs that grow more slowly, as those of gilts or members of large litters or of sows that give but a scanty milk supply, usually escape serious attacks of anemia.

In 62 litters in which blood examinations were made, 40% of the pigs affected with anemia died. The administration of 25mg of iron sulphate and 5mg of copper daily per pig, was found to prevent the disease and to be an effective treatment for affected pigs when its administration was commenced early. If commercial iron sulphate is used it may not be necessary to use copper, since this salt is usually contaminated with sufficient copper.

The solution of iron and copper sulphate may be administered to the pigs directly with a medicine dropper once daily, or the sow's udder may be wetted with the solution four or five times daily and the pigs permitted to obtain the salt when sucking. A solution of iron and copper salts has been mixed with corn syrup to make it adhere to the udder better, but there appeared to be no advantage in this and a disadvantage in that it caused dirt to adhere to the udder.

Anemia does not occur in pigs that are permitted to run out of doors from birth or to any extent in pigs kept on dirt floors. It did, however, occur in cement floored outside pens about as frequently as in pigs kept in houses on similar floors.

*Notes from an address by T. J. Hamilton, Associate in Animal Nutrition, University of Illinois, at the Twelfth Annual Illinois Veterinary Conference, University of Illinois, Urbana, Feb. 10-12, 1931.

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Tuberculin testing in New York State: Herds tested 1929, 7,944; 1930, 91,654; cattle tested 1929, 913,715; 1930, 1,130,271; number of reactors found, 1929, 52,284; 1930, 54,651.

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## NEW HIGH RECORD IN TUBERCULIN TESTING

More cattle were officially tuberculin tested in Iowa in February than in any state in any month previously. Of the 1,274,913 tuberculin tests in all states that month, Iowa made 223,710 or nearly one-fifth of the national total.

The remarkable achievement comes at a time when the work is meeting with misguided opposition in some parts of the state. Herd owners in Iowa evidently intend to continue the present rate of progress. On the first of March, according to Federal records, there were 700,000 cattle on the waiting list to receive the test. This waiting list is more than double that of any other state.

The campaign is also making excellent progress in other states, the records show. In Minnesota, official veterinarians tested 167,465 cattle during February, while Illinois showed 120,633 tests and Wisconsin 96,113. There are now 1,145 counties that have reduced the extent of tuberculosis in cattle to one-half of 1 per cent or less, thus placing such counties in the modified accredited area.